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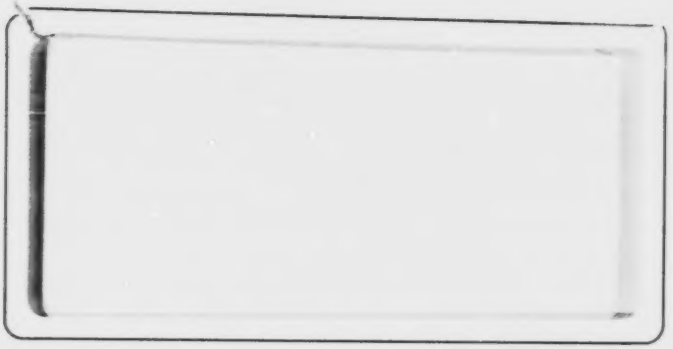

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OCT 25 1988

COMPOSITE PANEL FACILITY

PRELIMINARY FEASIBILITY STUDY - PHASE I

NORTH WESTERN NEW BRUNSWICK AREA

FOR

DEPARTMENT OF COMMERCE AND TECHNOLOGY

PROVINCE OF NEW BRUNSWICK

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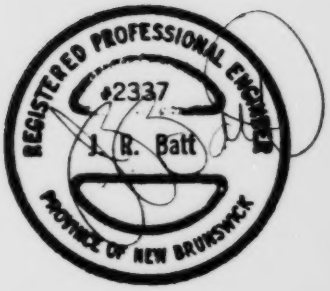

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Composite Panel Facility Feasibility Study - Phase I
North Western New Brunswick Area
For
Department of Commerce and Technology

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Composite Panel Facility Feasibility Study - Phase I
North Western New Brunswick Area
For
Department of Commerce and Technology

1. Introduction

The Province of New Brunswick, Department of Commerce & Technology wishes to evaluate the feasibility of constructing a composite panel board facility in the northwestern region of New Brunswick.

Consideration will be given to the construction of either an oriented structural board (OSB) manufacturing facility, a particleboard (PB) plant, or a medium density fiberboard (MDF) facility utilizing the hardwood species available in the area. This study includes both the engineering and marketing aspects associated with the development of such a facility.

The feasibility study, as requested by Commerce and Technology is divided into three phases. Phase I is a preliminary analysis based on file information and will consider OSB, MDF and PB facilities in sufficient detail to allow the Department of Commerce and Technology to determine which if any option is sufficiently attractive to proceed with further.

It has been determined that the raw material resource in the area concerned is adequate to supply an economically sized manufacturing facility. Raw material projections are in accordance with woodland projections made in the "Study of Utilization of Surplus Hardwood Resources for New Brunswick" report prepared for the then Department of Commerce and Development of the Province of New Brunswick by Neill and Gunter Limited in association with E. S. Fellows, Forestry Consultant and D. G. Bell & Associates Inc. in May of 1985.

Phases II and III will concentrate on one specific manufacturing plant type as determined in Phase I. Phase II will provide a "Detailed Market Research Study", while Phase III will provide a "Detailed Technical and Financial Study" into the construction of the specific plant type. When undertaken, Phases II and III will be carried out simultaneously to reduce the time required to complete the study.

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Composite Panel Facility Feasibility Study - Phase I
North Western New Brunswick Area
For
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2.0 Summary and Conclusions

The following is a summary of the projected major features of the three plant types under consideration:

Item	OSB Plant	PB Plant	MDF Plant
Plant Size	138 MMSF/yr (3/8" basis)	60 MMSF/yr (3/4" basis)	53 MMSF/yr (3/4" basis)
Capital Cost	$40,000,000	$40,000,000	$43,000,000
Assured Shareholders Invest.	5,800,000	7,200,000	6,000,000
Total Plant Staff	107	99	99
Annual Sales	$28,500,000	$20,000,000	$27,000,000
Construction Time	20 mo.	20 mo.	20 mo.
Marketing Potential	Good	Poor	Limited
DCFROI, after taxes	33.2%	(no return)	37.6%

Both the OSB and MDF plants look good from a technical and operating point of view. The marketing analysis, however, indicates a better potential for sales of an OSB product.

Therefore it is recommended that the OSB plant be considered in Phases II and III of this study. Some concern exists on the availability of wood supplies if region 5 alone is considered. These concerns should be addressed during the detailed study phase.

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Composite Panel Facility Feasibility Study - Phase I
North Western New Brunswick Area
For
Department of Commerce and Technology

3.0 Market Analysis

3.1 Introduction and Conclusions

This is the preliminary market overview for a potential new panelboard facility to be located in North Western New Brunswick. The facility being considered will produce one of three products; waferboard/OSB, particleboard, or medium density fiberboard (MDF). This review will assess the overall market potential for each of these products, and will provide information needed to make a decision on which type of facility should be further studied in Phases II and III. This market analysis was completed by Siskin Management Inc. for NGM International.

This study reviewed two major product areas: structural panels, supplied by softwood plywood and waferboard/OSB and industrial panels, supplied by MDF and particleboard. The overall market for wood panels has grown at approximately 4%/year from 1979 - 1986.

North American Panel Market

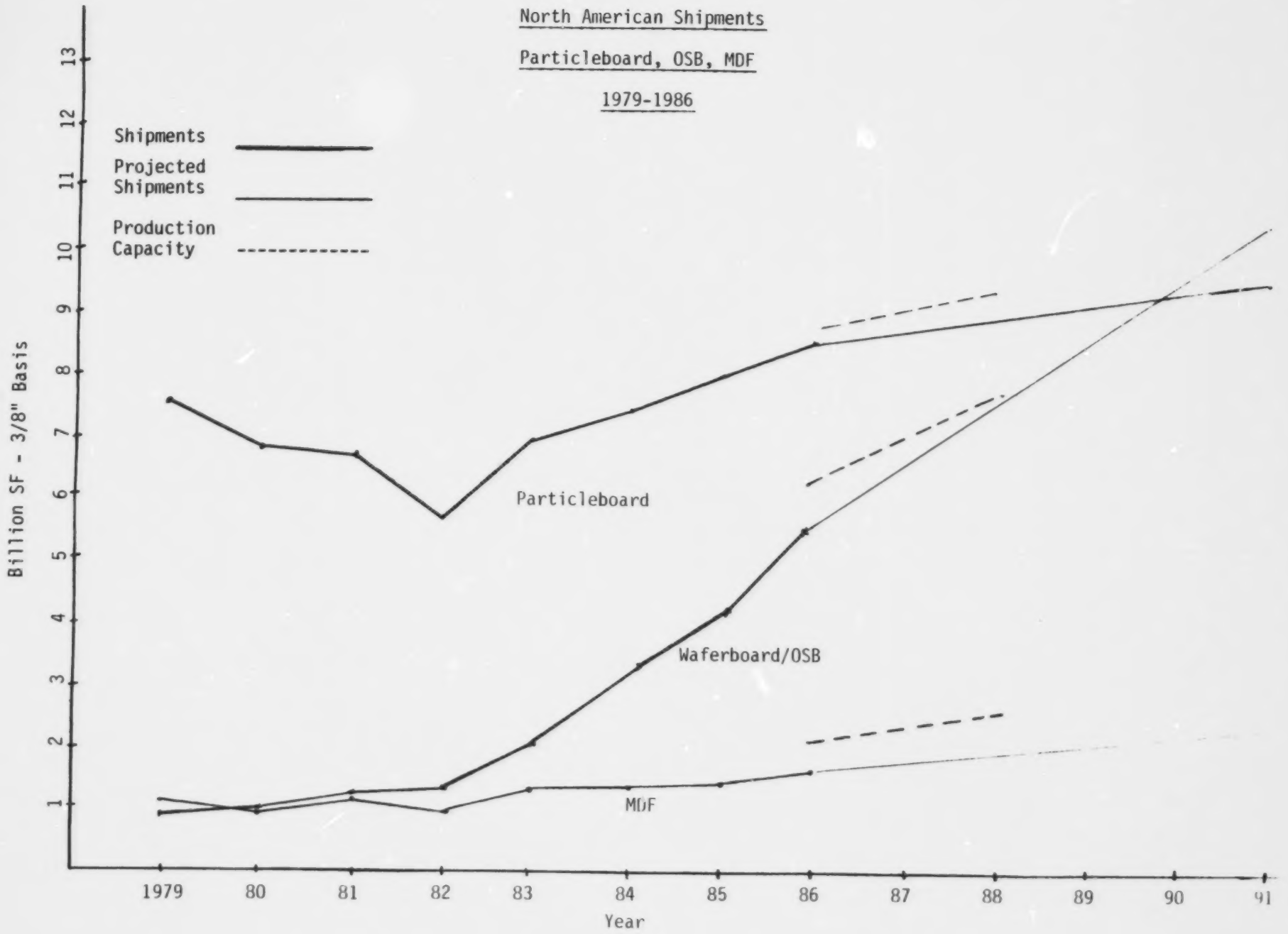
Growth Rate/Year

1979 - 1986

Panel Type	% Growth/Year
Plywood	0.6%
Waferboard/OSB	29.8%
Particleboard	1.7%
MDF	6.4%
All Panels	4.0%

The demand for structural panels and industrial panels has only now reached the record highs achieved in the mid 1970's. The total North American demand for structural panels is in the 30 bsf (billion square feet) range (3/8" basis), and for industrial panels, 5 bsf, 3/4" basis. Historical shipments of particleboards, OSB and MDF are shown on the graph, page 3-2.

Waferboard/OSB is capturing market share from softwood plywood and from particleboard used as underlayment and mobile home decking. MDF is capturing market share from particleboard used in


North American Shipments
Particleboard, OSB, MDF
1979-1986
Shipments
Projected Shipments
Production Capacity
Billion SF - 3/8" Basis
1
2
3
4
5
6
7
8
9
10
11
12
13
Particleboard
Waferboard/OSB
MDF
1979
80
81
82
83
84
85
86
87
88
89
90
91
Year

furniture and fixtures, and solid wood. Particleboard does not cannibalize any market, and must maintain existing share and/or develop new markets to prosper.

Projected demand for all 3 products for 1991 shows annual consumption levels of OSB at 9-10 bsf and industrial panels at 12-13 bsf (all 3/8" basis).

Projected Demand, Particleboard, MDF, OSB

1991

BSF, 3/8" Basis

		Siskin Management Inc.	Resource Information Systems, Inc.
Particleboard	Low	9.23	10.90
	High	11.3	
MDF	Low	2.12	2.348
	High	2.4	
OSB	Low	9.4	9.2
	High	10.6	

Today, all demand for these panels can be supplied by existing plant capacity. It is expected that growth will continue at a lower rate than had occured in the 1970's (for particleboard and MDF).

The opportunity to build new plants will occur when (a) you replace aging, less efficient plants, (b) build closer to end users, (c) and provide a more cost/competitive product.

North American

Projected Capacity (1988)

BSF - 3/8" Basis

Particleboard	9.50
MDF	2.71
OSB	7.88
	20.10

In January, 1986 there were 15 new panel plants under construction, planned, or recently started in the USA and Canada. Of these, 10 were waferboard/OSB, and 5 were MDF. There were no new particleboard plants. Since then, 3 particleboard plants have been announced, located in Pennsylvania, Virginia and North Carolina.

Comparison of Panel Needs

In Eastern North America

Panel Type	Region	Panel Net Need (MSF), 1988	
		Within Region	Including Shipments From Adjacent Areas
OSB	1	-1140	-373
PB	1, 2, 4	-400	OK
MDF	1, 2, 4	-107	OK
Industrial PB + MDF	1, 2, 3, 4	-210	OK

(Negative indicates deficit)

Legend: Region 1. U.S. N.E. 3. U.S. South
2. U.S. N.C. 4. Eastern Canada

Because the Canadian panel market has tremendous overcapacity for all three products, new mills must rely upon major exports to the U.S. The obvious market for a New Brunswick based plant is the U.S. North East. A comparison of panel needs in the East shows the largest net deficit for Waferboard/OSB.

Based upon the marketing aspects of this study, there is sufficient need for waferboard shipments to this region to warrant further study in Phases II and III.

3.2 Waferboard/OSB

3.2.1 Introduction

Waferboard is a structural composition board panel product produced from engineered flakes and bonded with waterproof resins. Oriented Structural Board (OSB) is a structural composition board panel product produced to improve strength and stiffness in the longitudinal direction. Waferboard/OSB is used for many applications, the majority associated with the use of a structural sheathing, roofing and flooring product for residential/non residential construction, or miscellaneous uses such as framing, crating, containers, etc.

3.2.2 Supply

The North American waferboard industry has grown steadily since 1978, with total current operating plant production capacity at approximately 6.1 billion square feet (on a 3/8" basis) per year. This represents an industry capacity compound growth rate of 23.7% per year from 1978 to 1987. Additional plant capacity of 1.8 billion square feet per year is under construction or has been announced.

Table 3.1 shows the plant capacity in each of the major regions of the USA and Canada, for 1986 and 1988 (projected).

Table 3.2 shows the list of all waferboard plants, presently operating, under construction or announced, for both Canada and the USA.

Table 3.1

Waferboard Plant Capacity (Million sf/year, 3/8" basis)

U.S.A.

	WEST	SOUTH	NORTH CENTRAL	NORTH EAST	TOTAL
1986	270	1590	1585	570	4015
1988	700	1955	1845	570	5070
INCREASE	430	365	260	0	1055

CANADA

	WEST	ONTARIO	QUEBEC	ATLANTIC	TOTAL
1986	850	626	400	186	2062
1988	1110	866	650	186	2812
INCREASE	260	240	250	0	750

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Present and Planned Capacity - Structural Composition Board Plants

May, 1987

Table 3.2

			Capacity - Million Sq. Ft./Year - 3/8" Basis
Present Operating Plants - Canada			
1.	MacMillan-Bloedel	- Hudson Bay, Saskatchewan	150
2.	" "	- Thunder Bay, Ontario	150
3.	Waferboard Corporation	- Timmins, Ontario	80
4.	Weldwood of Canada	- Long Lac, Ontario	136
5.	J. H. Normick Inc.	- LaSarre, Quebec - 1980	80
6.	Alberta Aspen (Weldwood of Canada Ltd.)		170
7.	Waferboard Corporation	- St. George de Champlain, Quebec - 1980 (OSB)	160
8.	Grant Waferboard	- Englehart, Ontario	200
9.	Forpan	- Val d'Or, Quebec - (OSB)	160
10.	Pelican	- Edson, Alberta	240
11.	Sturdi-Board	- Drayton Valley, Alberta	240
12.	Atlantic Waferboard (Northwood Rebuild)	- Chatham, New Brunswick	186
	TOTAL CANADIAN PRODUCTION		2062
Plants Under Construction/Planned Plants - Canada			
13.	Louisiana-Pacific	- Dawson Creek, British Columbia (January, 1987)	260
14.	Normick Perron Inc.	- Chambord, Quebec	250
15.	Grant Waferboard	- Englehart, Ontario	240
	TOTAL CANADIAN, PRESENT UNDER CONSTRUCTION AND PLANNED		750
	TOTAL CANADA		2812
Present Operating Plants - United States			
16.	Blandin Wood Products	- Grand Rapids, Minnesota (2 lines)	285
17.	Louisiana-Pacific Corporation	- Hayward, Wisconsin (2 lines)	320

18.	Georgia-Pacific Corporation	- Woodland, Maine	
19.	Potlatch Paper	- Cook, Minnesota	170
20.	Elmendorf	- Claremont, New Hampshire	170
21.	Northwood Panelboard	- Bemidji, Minnesota - 1981	80
22.	Louisiana-Pacific Corporation	- Houlton, Maine (OSB)	240
23.	Potlatch Paper	- Bemidji, Minnesota	160
24.	Weyerhaeuser Company	- Grayling, Michigan - (OSB)	180
25.	J. M. Huber Corporation	- Easton, Maine	300
26.	Martco	- LeMoyen, Louisiana	160
27.	Louisiana-Pacific Corporation	- Corrigan, Texas	170
28.	Georgia-Pacific Corporation	- Dudley, North Carolina	140
29.	Louisiana-Pacific Corporation	- Chilco, Idaho	120
30.	Louisiana-Pacific Corporation	- Montrose, Colorado	90
31.	Louisiana-Pacific Corporation	- Kremmling, Colorado	90
32.	Louisiana-Pacific Corporation	- Two Harbors, Minnesota (Waferboard Siding)	90
33.	Louisiana-Pacific Corporation	- Urania, Louisiana	90
34.	Georgia-Pacific Corporation	- Grenada, Mississippi	120
35.	Georgia-Pacific Corporation	- Skippers, Virginia	250
36.	Louisiana-Pacific Corporation	- Dungannon, Virginia	250
37.	International Paper Company	- Nacogdoches, Texas	90
38.	Louisiana-Pacific Corporation	- New Waverly, Texas	190
39.	Weyerhaeuser	- Elkin, North Carolina	90
	Total US Production		170
			4015
	Plants Under Construction - United States		
40.	Louisiana-Pacific Corporation	- Sagola, Michigan (September, 1987)	260
41.	Langboard	- Valdosta, Georgia (October, 1987)	135
	Total US Under Construction		395
	Planned Plants - United States		
42.	Georgia-Pacific	- Beaver Marshes, Oregon (Indefinite)	230
43.	Georgia-Pacific	- Glade Springs, Virginia (Indefinite)	230
44.	Weyerhaeuser	- Klamath Falls, Oregon (January, 1989)	200
	Total US Planned		660
	TOTAL US PRESENT, UNDER CONSTRUCTION AND PLANNED		5070

3.2.3 Demand

United States statistics combine waferboard and OSB production data with softwood plywood production, and report as structural panels. Softwood plywood and waferboard/OSB all essentially enter the same end-use market.

For comparative purposes, the total shipments of all wood based panels in the USA, 1984 - 1986, are listed.

Table 3.3

USA Wood Based Panels Trade 1984 - 86, (billions of ft^2)

Product	1984	1985	1986
Softwood Plywood	19.84	20.10	22.45
Hardwood Plywood	2.45	2.39	2.50
Particleboard	3.20	3.30	3.40
OSB/Waferboard	2.09	2.60	3.14
MDF	0.64	0.70	0.80
Fibreboard/Insulation Board	2.50	2.20	2.51
Hardboard	3.68	3.85	4.20

The market for structural panel products can be divided into five major categories. These categories, with the approximate market share are listed:

Table 3.4

Structural Panel Shipments (USA)

New Residential	40%
Repairs and Remodeling	28%
Non Residential Construction	15%
Exports	2%

3.2.4 Pricing

Pricing level for Waferboard is currently at $US149/MSF (7/16" basis) for the U.S. North East (F.O.B. duty and freight included).

Waferboard Prices

Yearly Average - 7/16", 24/0

U.S. $

(Prices Delivered Windsor, Duty Paid)

1984	$149
1985	$156
1986	$154

3.2.5 Factors Which Affect Production Levels

There are several variables which affect the production levels and consumption patterns of waferboard/OSB, particularly for a manufacturer located in New Brunswick.

- housing starts per year, USA and Canada
- relative number of housing starts in the United States Northeast, and North Central regions, as well as Canada.
- percent of waferboard penetration (to total structural panel sales) in the target market areas.
- availability and pricing of alternative structural panels (eg. plywood).
- waferboard plant capacity in the United States and Canada, particularly those plants which supply the US North East, US North Central, and Eastern Canada.
- level of production from existing facilities and destination of shipments.
- tariff barriers at US border.
- level of Canadian imports to the United States.
- pricing levels.
- competitive pressures, marketing strategies, and marketing methods.
- transportation costs.
- costs of production, wood supply, etc.

3.2.6 Market Penetration

Since 1979, Waferboard/OSB shipments in the U.S.A. and Canada have grown at 34.3% and 15.9% respectively per year. Market penetration has varied considerably by region. The following comparison shows the different levels of market penetration by waferboard and plywood.

.1 Waferboard

Concentration of production capacity is in the U.S. South, North Central and Canada. Corresponding high consumption of waferboard exists in U.S. North Central, North East and Canada, Ontario and Quebec.

Weak penetration of waferboard occurs in USA West and South.

.2 Plywood

USA - very strong correlation between plywood consumption and housing starts in all 4 regions.

Canada - high consumption of plywood in West; proximity to major production capacity.

Waferboard/OSB shipments represent 17.2% and 42% of the total structural panel consumption in the United States and Canada respectively.

It is predicted to represent twenty-four to twenty-six percent of the total USA structural panel market by 1988. Based on experience in Canada, this penetration rate will probably continue to increase.

Data showing market penetration in the US and Canada, for waferboard/OSB any plywood is shown in Table 3.4.

Table 3.5

Comparison of Housing Starts to Panel Consumption, 1985

USA

	West	South	North Central	North East
% Total Housing Starts	26.8%	44.8%	13.9%	14.4%
Shipments				
% Total WB/OSB	7.7%	20.8%	36.2%	35.3%
% Total Plywood	28.6%	41.2%	16.1%	14.7%
% Total Shipments	25.6%	38.3%	18.9%	17.2%
Production				
% Total WB/OSB	6.5%	36.5%	43.2%	13.7%

Canada

	West	Ontario	Quebec	Atlantic
% Total Housing Starts	23.0%	39.2%	28.9%	8.9%
% Population -	29.2%	36.0%	25.8%	9.0%
Shipments				
% Total WB/OSB	21.3%	54.0%	18.2%	6.4%
% Total Plywood	43.4%	29.2%	21.7%	5.6%
% Total Shipments	38.5%	35.9%	20.7%	5.8%
Production				
% Total WB/OSB	41.2%	29.0%	20.3%	9.4%

3.2.7 Strong Correlation - Panel Consumption to Housing Starts

New residential construction represents approximately 40% of the end market for structural panel products. Historically, there has been a strong correlation between housing starts and structural panel demand. With housing starts projected to remain in the 2 million/year range for North America, and with increasing market penetration, waferboard/OSB markets are expected to continue growing. Table 3.6 shows the historical housing starts, demand for plywood, waferboard/OSB and structural panel products and projections for future years.

Table 3.6

Housing Starts and Structural Panel Demand

North American Market

Year	Housing Starts x 10^6			Struct. Panel Demand - BSF - 3/8"			Waferboard/OSB Demand - BSF - 3/8"		
	U.S.	Can.	Total	U.S.	Can.	Total	U.S.	Can.	Total
1979	1.72	.21	1.93	20.0	2.6	22.6	0.58	.29	0.87
1980	1.30	.16	1.46	17.6	2.4	20.0	0.61	.31	0.92
1981	1.10	.18	1.28	17.3	2.5	19.8	0.73	.41	1.14
1982	1.06	.13	1.19	16.3	2.1	18.4	0.91	.33	1.24
1983	1.71	.16	1.87	20.4	2.4	22.8	1.57	.49	2.06
1984	1.76	.14	1.90	23.0	2.3	25.3	2.50	.63	3.13
1985	1.74	.16	1.90	23.7	2.5	26.2	3.37	.73	4.10
1986	1.90	.19	2.09	26.6	2.8	29.4	4.57	.83	5.40
1988	1.80	.18	1.98	26.9	3.0	29.9	6.41	1.03	7.44
1992	1.70	.18	1.88						
1994	1.80	.18	1.98						

NOTE: BSF = 1,000,000,000 square feet

3.2.8 Markets for a Plant Located in New Brunswick

A plant located in New Brunswick must be able to sell its products in the Atlantic Provinces as well as the North East United States. Secondary markets would be to the North Central United States, and exports to Europe. Data is consolidated in Table 3.7, to show shipments of waferboard and plywood to the primary markets (Atlantic Provinces and USA North East) and secondary markets (USA North Central) for a plant located in New Brunswick. This shows a potential market for waferboard/OSB of 1.77 billion sf/year, 3/8" basis in the primary market area, and an additional 1.98 million sf/year to the secondary market area in 1988.

Table 3.7

Calculate Total Market Size for a WB/OSB Plant Located in NB

USA NORTH EAST

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
WB/OSB	0.16	0.20	0.25	0.31	0.50	0.85	1.19	1.56	1.64	1.71
PLYWOOD	2.50	2.20	2.20	2.00	2.40	2.80	2.80	3.20	3.20	3.00
TOTAL	2.66	2.40	2.45	2.31	2.90	3.65	3.99	4.76	4.84	4.71
% WB/TOTAL	6.02%	8.33%	10.20%	13.42%	17.24%	23.29%	29.82%	32.7%	33.9%	36.31%

ATLANTIC PROVINCES

WB/OSB	0.02	0.02	0.03	0.02	0.03	0.04	0.04	0.05	0.05	0.06
PLYWOOD	0.14	0.12	0.11	0.08	0.12	0.10	0.10	0.11	0.13	0.16
TOTAL	0.16	0.14	0.14	0.10	0.14	0.14	0.15	0.16	0.18	0.22
% WB/TOTAL	12.50%	15.49%	23.08%	21.78%	19.58%	27.78%	29.66%	33.96%	27.8%	26.91%

TOTAL PRIMARY MARKET AREA (FOR A PLANT LOCATED IN NB)

WB/OSB	0.18	0.22	0.28	0.33	0.53	0.89	1.23	1.61	1.69	1.77
PLYWOOD	2.64	2.32	2.31	2.08	2.52	2.90	2.90	3.31	3.33	3.16
TOTAL	2.82	2.54	2.59	2.41	3.04	3.79	4.14	4.92	5.02	4.93
% WB/TOTAL	6.38%	8.73%	10.91%	13.77%	17.35%	23.46%	29.82%	32.8%	33.7%	35.88%

USA NORTH CENTRAL

WB/OSB	0.28	0.28	0.32	0.38	0.62	0.94	1.22	1.64	1.87	1.98
PLYWOOD	4.20	3.40	3.00	2.80	3.10	3.40	3.20	3.60	3.50	3.40
TOTAL	4.48	3.68	3.32	3.18	3.72	4.34	4.42	5.24	5.37	5.38
% WB/TOTAL	6.25%	7.61%	9.64%	11.95%	16.67%	21.66%	27.60%	31.3%	34.8%	36.80%

TOTAL MARKET AREA

WB/OSB	0.46	0.50	0.60	0.71	1.15	1.83	2.45	3.25	3.56	3.75
PLYWOOD	6.84	5.72	5.31	4.88	5.62	6.30	6.10	6.91	6.83	6.56
TOTAL	7.30	6.22	5.91	5.59	6.76	8.13	8.56	10.16	10.4%	10.31
% WB/TOTAL	6.30%	8.07%	10.20%	12.73%	16.97%	22.50%	28.67%	32.0%	34.2%	36.36%

3.2.9 Supply and Demand for Waferboard/OSB - Canada

In 1986, all regions of Canada had excess production capacity, over and above regional demand requirements. By 1988, it is predicted that the Canadian Waferboard Industry will have approximately 260% more production capacity, than the domestic market will require. The supply and demand requirements for each of the four regions are shown below (1986 and 1988).

Table 3.8

Canada - Demand/Supply/WB/OSB - 1986 (million sf - 3/8")

Demand: Positive

Supply: Negative

	West	Ontario	Quebec	Atlantic	Total	Shipments
Demand	-189	-452	-155	-54	-850	-837
Supply	950	626	400	186	2062	
Available For Export	661	174	245	132	1212	695

Canada - Demand/Supply/WB/OSB - 1988

	West	Ontario	Quebec	Atlantic	Total
Demand	-230	-530	-210	-60	-1030
Supply	1110	866	650	186	2912
Available For Export	880	336	440	126	1782

3.2.10 Canadian Exports to the United States

With this tremendous over capacity, Canadian plants have been in a good position to supply the growing United States market, particularly in the North Central and North East regions. Historical exports to the United States are shown in Table 3.9.

Table 3.9

Canadian Exports, Waferboard to USA 1979 - 1986

	1979	1980	1981	1982	1983	1984	1985	1986	AVG
Production	644	616	784	556	975	1345	1511	1522	
Exports	304	340	336	272	426	715	837	695	
% Canada	47.20%	55.19%	42.86%	48.92%	43.69%	52.16%	55.39%	45.66%	49.01%
USA WB Consumption	590	610	730	910	1570	2500	3370	4570	
% Supply	51.33%	55.74%	46.03%	29.89%	27.13%	28.60%	24.84%	15.21%	

During the past 8 years, exports to U.S. have represented on the average, 49% of Canada's production capacity. Canadian supply as a per cent of USA consumption has decreased to 15.2% of the total, from a high of 55.8% in 1980. This figure will probably continue to decline as new US plants are established.

3.2.11 Supply & Demand for Waferboard/OSB - USA

Having identified the supply/demand model for Canada, and estimating potential export quantities, it is then necessary to look at the United States situation to evaluate opportunities for future export of waferboard/OSB.

The supply/demand requirements for each of the four regions of the United States is shown in Table 3.10.

Table 3.10

USA - Demand/Supply WB/OSB - 1986

Demand: Negative

Supply: Positive

	WEST	SOUTH	NORTH CENTRAL	NORTH EAST	TOTAL
Demand	-440	-940	-1220	-1190	-3790
Supply	270	1590	1585	570	4015
Import Needs	-170	650	365	-620	225
Available From Canada	661		174	377	1212
Net Need	491	650	539	-243	1437

USA - Demand/Supply WB/OSB - 1988

	WEST	SOUTH	NORTH CENTRAL	NORTH EAST	TOTAL
Demand	-660	-2040	-1980	-1710	-6390
Supply	700	1955	1845	570	5070
Import Needs	40	-85	-135	-1140	-1320
Available from Canada	880		336	566	1782
Net Need	920	-85	201	-574	462

In 1986, the West and North East had greater demand than supply. By 1988, it is expected that the North Central and North East regions will have demand greater than supply. It appears that in looking at the overall North American situation, there will be a surplus of capacity over projected demand by 462 million sf in 1988. There is a net deficit of 1320 million sf/year in the US with a 1782 million sf/year surplus in Canada.

This net surplus assumes that (a) industry can produce at 100% production rates (normal rates approximately 80-95%) and (b) that product can be moved from anywhere to meet demand. The normal consumption pattern is that material is shipped to end markets within 1000 miles of the plant.

3.2.12 Conclusions

Market Analysis - For N.B. Based Plant

The North East region will have a deficit of 1140 million sq. ft./year by 1988. Table 3.10 shows a supply/demand model for the North East Region, assuming imports of product from Quebec, Ontario and the Atlantic Region.

This shows a net deficit of 373 million sf, equivalent to the output of three waferboard/OSB plants at 120 million sf/year. This deficit is based upon a given level of demand.

There is sufficient opportunity for additional waferboard production capacity to serve the Northeast USA region to warrant further study in Phases II and III of this study.

Table 3.11

Market Demand/Supply Situation, WB/OSB

USA North East & Atlantic Provinces

1988 (million sf, 3/8")

	Demand, Negative	Supply, Positive	Net Surplus/ Deficit
Atlantic Provinces	-60	186	126
USA North East	-1710	570	-1140
Region Surplus/Deficit			-1014
Source of Supply to Region			
North Central U.S.			-135
Quebec			440
Ontario			336
Balance			-373

3.3 Particleboard

3.3.1 Introduction

Particleboard is a composite panel board manufactured from mill wood waste and low grade wood species. The board is made from small discrete wood elements with an adhesive binder (usually urea-formaldehyde) and is utilized in an interior area in which panels are not exposed to high temperatures or moisture.

3.3.2 Demand

The North American particleboard industry has not grown significantly during the past ten years. Overall, the industry has had a rather slow growth, with the compound growth rate in shipments of 1.7%/year from 1979 to 1986. Over the same period, waferboard/OSB had a growth of 29.8%/year, and MDF, 5.4%/year.

Table 3.12

Shipments of Particleboard (1)

U.S. and Canada

1979 - 1986

(Thousand Sq. Ft. 3/4 In. Basis)

	U.S.	Canada	Total
1979	3,376,488	401,090	3,777,578
1980	2,949,897	407,513	3,357,410
1981	2,869,352	403,945	3,273,297
1982	2,393,066	317,471	2,710,537
1983	3,009,343	405,392	3,414,735
1984	3,195,586	476,510	3,672,096
1985	3,330,517	591,861	3,922,378
1986	3,602,757	643,705	4,246,462
Growth Rate/Year	0.93%	7.0%	1.69%

Installed capacity has not changed significantly over the past 10-15 years. The number of mills has decreased, but larger, more efficient mills have replaced those that have closed. Other mills have modernized, or added capacity to put their mills in a more competitive position. Particleboard mills have also added refiner capacity and improved forming machines in an effort to narrow the differences between particleboard and medium density fiberboard.

Number of Particleboard Mills (1)

and Annual Capacities

(Capacity in Millions SF, 3/4" basis)

	U.S.A. South/East		U.S.A. West		Canada	
	Mills	Capacity	Mills	Capacity	Mills	Capacity
1976	43	2449	25	2010	16	470
1981	28	2120	20	1805	12	460
1986	28	2104	16	1514	11	730

(1) Source: National Particleboard Association

3.3.3 Price Levels

In the U.S., the particleboard industry saw record price highs in 1978 and lows in 1979. Between 1980 - 1986, prices fluctuated between 1978's high of $220 (U.S.) and 1979's low of $170 (U.S.). Specifically, the levels were:

Table 3.13 (1)

Average Price (F.O.B. Mill)

(U.S. Dollars/MSF, 3/4")

1978	$220
1979	$170
1980	$180
1981	$187
1982	$196
1983	$202
1984	$218
1985	$203
1986	$213

3.3.4 Factors Which Affect Demand

Several factors influence the demand for particleboard in North American markets. The following identifies some of the constraints:

- level of housing starts
- demand for furniture and cabinets
- use of wall paneling in manufactured homes
- formaldehyde-emission standards
- availability of "value added" products such as "cut-to-size" and those with low pressure or vinyl laminates
- development of OSB and Waferboard for non-industrial uses
- cost of product in contrast to plywood and lumber
- development of particleboard as an alternative to laminates for vertical and low wear horizontal surfaces and other products such as counter tops and shelves
- import competition

(1) Source: National Particleboard Association

- technological parameters such as smoothness, density, moisture, resin content, overall consistency, static conductivity
- increasing use of lamination in furniture
- continued emphasis on business furniture markets eg. computer requirements
- furniture manufacturers' demand: laminating capability, straight and uniform board edges, easy cutting characteristics, easy and strong board connections

The most identifiable trend in particleboard manufacturing has been the upgrading of board faces in response to an increasingly sophisticated industrial market. The use of light weight paper laminates, thin vinyls, and water base laminating adhesives has created a demand for more finely textured board surfaces.

3.3.5 Two Main Uses of Particleboard

The two main uses for particleboard are industrial and construction. Industrial uses are mainly in the furniture industry. Construction use is mainly for mobile home decking and underlayment. Particleboard used for industrial purposes increased from 49.6% of total in 1979 to 66.6% in 1986. The average ratio of industrial to total consumption was 56.7% for the period 1979 - 1986.

Table 3.14

U.S. Shipments by End Use (1)

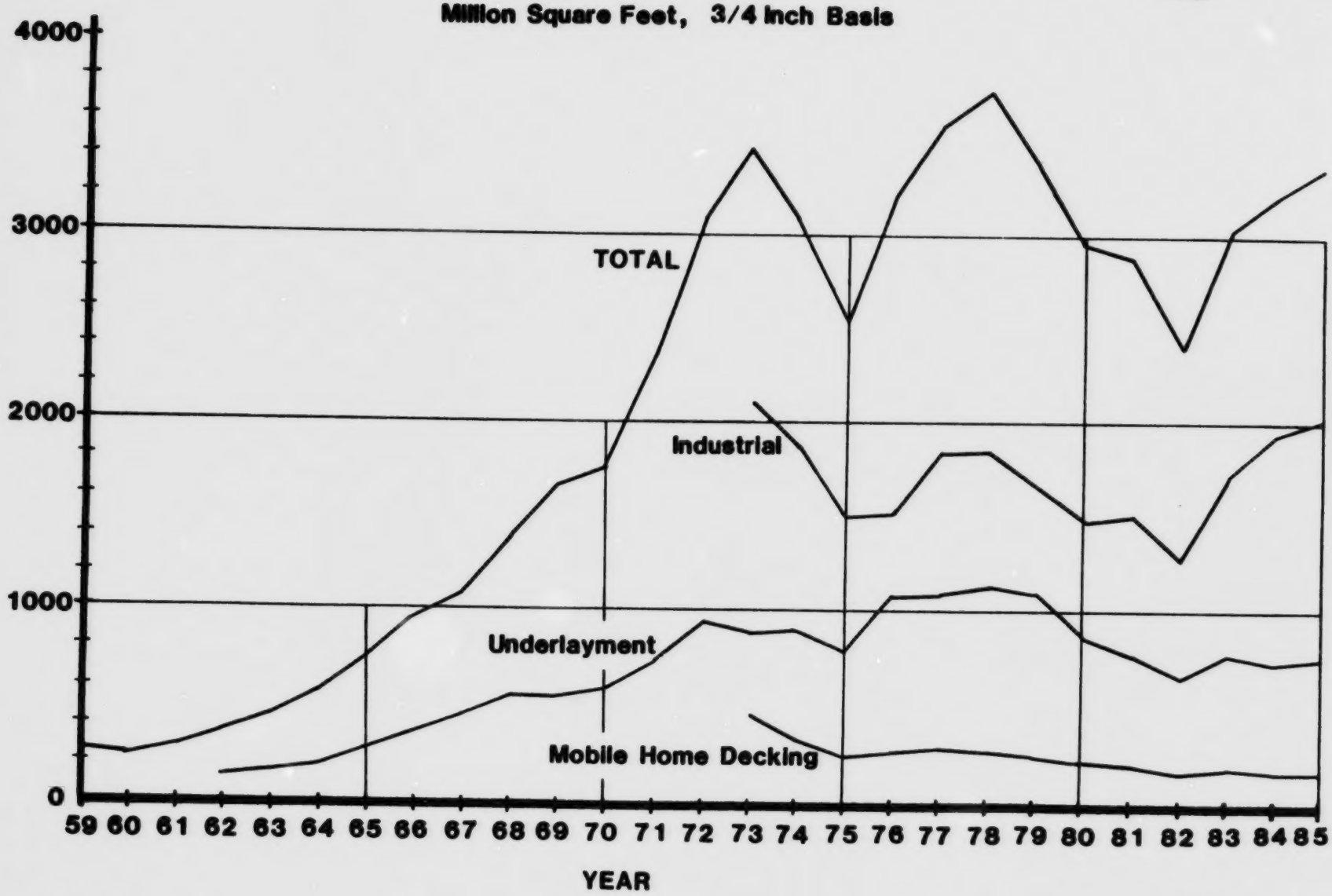
(Millions SF, 3/4" Basis)

Year	Industrial	Construction	Total	% Industrial
1979	1675	1701	3376	49.6%
1980	1502	1448	2950	50.9%
1981	1531	1338	2869	53.2%
1982	1306	1086	2392	54.6%
1983	1730	1279	3009	57.5%
1984	1943	1252	3195	60.8%
1985	2015	1315	3330	60.5%
1986	2239	1363	3602	66.6%

(1) Source: National Particleboard Association

U.S. PARTICLEBOARD SHIPMENTS

Million Square Feet, 3/4 Inch Basis



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The Canadian Industry is also heavily dependent on the industrial/furniture market for its sales.

Two major factors therefore influence demand: (a) industrial - the level of furniture and fixtures manufacturing in North America; (b) construction - the general level of construction activity and especially the level of housing starts.

3.3.6 Furniture and Fixtures Manufacturing

The interior panels market is highly dependent on the furniture and fixtures market. Imported furniture to the United States has a big impact on domestic panel production. The level of imported furniture is increasing, and the overall level of United States furniture production is down. This combined with imports of Canadian particleboard has put strong pressure on the U.S. industry. Medium density fiberboard (MDF) has also been making inroads to particleboard's traditional markets.

3.3.7 North American Housing Market

Since 1979, North American housing starts have fluctuated from 1.2 to 2.1 million. The last four years have seen reasonably steady levels of starts, from 1.9 to 2.1 million starts/year.

A simple regression analysis on the relationship between housing starts and particleboard consumption shows a strong relationship, with a coefficient of correlation of 0.89. One would expect the strong correlation, with the use of particleboard in home construction and the purchase of new furniture dependent upon the level of new home construction.

	North American Housing Starts	Particleboard Consumption (thousands sf - 3/4" basis)
1979	1,930,000	3,777,578
1980	1,460,000	3,357,410
1981	1,280,000	3,273,297
1982	1,190,000	2,710,537
1983	1,870,000	3,414,735
1984	1,900,000	3,672,096
1985	1,900,000	3,922,378
1986	2,090,000	4,246,462

With housing starts projected to remain in the 1.8 to 2.1 million/year level over the next decade, the strong pressure on the furniture industry from imports, and strong competition from MDF, North American domestic particleboard shipments over the next few years are projected to be in the 4.1 to 4.6 billion sf/year range.

3.3.8 North American Particleboard Industry, Plant Capacity

The National Particleboard Association (NPA) projects that by the end of 1987, particleboard capacity in the U.S. will be up to 4.1 b.s.f. Existing facilities in the U.S. and Canada and their capacities are listed below:

NGM INTERNATIONAL

Present and Planned Capacity - Particleboard Plants [1]

May, 1987

Table 3-15

Present Operating Plants - U.S.		Capacity - Million Sq. Ft./Year - 3/4" Basis
1. American Forest Products Co.	- Martell, Calif.	110
2. Bohemia Inc.	- Eugene, Ore.	72
3. Boise Cascade Corp.	- La Grande, Ore.	181
4. Broyhill Furniture	- Lenoir, N.C.	50
5. Ellingson Lumber Co.	- Baker, Ore.	20
6. Florida Plywoods Inc.	- Greenville, Fla.	10
7. Georgia-Pacific Corp.	- Vienna, Ga.	105
	- Louisville, Miss.	75
	- Taylorsville, Miss.	85
	- Russellville, S.C	125
8. Giles & Kendall Inc.	- Huntsville, Ala.	10
9. Hambro Forest Products	- Crescent City, Calif.	30
10. Jasper-American Mfg. Co.	- Henderson, Ky.	6
11. Kirby Forest Industries Inc.	- Silsbee, Texas	74
12. Lane Co. Inc., The	- Altavista, Va.	70
13. Louisiana-Pacific Corp.	- Arcata, Calif.	100
	- Missoula, Mont.	98
14. Masonite Corp.	- Stuart, Va.	50
15. Nu-Woods Inc.	- Lenoir, N.C.	23.5
16. Ponderosa Products	- Navajo, N.M.	40
	- Albuquerque, N.M.	45
17. Potlatch Corp.	- Post Falls, Idaho	73
18. Publishers Paper	- Philomath, Ore.	20.7
	- Sweet Home, Ore.	N.R.
19. Rodman Industries Inc.	- Marinette, Wis.	22
20. Roseburg Lumber Co.	- Mills 1 & 2, Dillard, Ore.	310
21. Swain Industries	- Evanston, Ind.	15

(1) Source: Forest Industries

Present Operating Plants - U.S.		Capacity - Million Sq. Ft./Year - 3/4" Basis
22. Temple-Eastex Inc.	- Diboll, Texas	92
	- Monroeville, Ala.	100
23. Timber Products Co.	- Thomson, Ga.	106
24. Union Camp Corp.	- Medford, Ore.	96
25. U.S. Plywood Corp.	- Franklin, Va.	85
	- Gaylord, Mich.	200
	- Oxford, Miss.	180
26. Vanply Inc.	- South Boston, Va.	100
27. Weyerhaeuser Co.	- Many, La.	N.R.
	- Adel, Ga.	75
	- Klamath Falls, Ore.	100
	- Moncure, N.C.	100
	- Springfield, Ore.	96
	- Marshfield, Wis.	66
28. Willamette Industries Inc.	- Lillie, La.	100
	- Surepine Division, Ruston, La.	83
	- Duraflake Division, Albany, Ore.	170
	- Korpine Division, Bend, Ore.	150
TOTAL U.S. PRODUCTION		3719.2
Plants Under Construction/Planned Plants - U.S.		
29. Masonite Corp.	- Stuart, Va (1987)	50
30. Weyerhaeuser	- Moncure, N.C. (1987)	110
31. Alleghany Particleboard Corp.	- Mt. Jewett, Penn. (1988)	170
TOTAL U.S. PRESENT, UNDER CONSTRUCTION AND PLANNED		330
TOTAL U.S. - 1988		4049.2

Present Operating Plants - Canada

32.	Canpar Industries	- Grand Forks, B.C.	36
33.	Domtar Const. Matls.	Huntsville, Ont.	45
34.	Flake Board Co. Ltd.	- Saint Stephen, N.B.	40
35.	Forex-Leroy Inc.	- Val D'Or, Que.	122
36.	Levesque Plywood Ltd.	- Hearst, Ont.	50
37.	MacLaren Industries Inc.	Buckinghames, Que.	
		- Lac Des Iles, Que.	71
38.	MacMillan Bloedel Ltd.	- Vancouver, B.C.	50
39.	Northwest Panelboard	- Logging Ltd., Smithers, B.C.	N.R.
40.	Panval Inc.	- Sayabec, Que.	116.7
41.	Pluswood Manufacturing Inc.	- Atikokan, Ont.	80
42.	Rexwood Products Ltd.	- New Liskeard, Ont.	35
43.	Waferboard Corp. Ltd.	- Timmins, Ont.	36
	TOTAL CANADIAN PRODUCTION		681.7

(1) Source: Forest Industries

3.3.9 The Canadian Particleboard Industry

The Canadian Particleboard Industry has been growing steadily during the past few years.

Table 3.15

Canadian Particleboard Industry (1)

(million sf - 3/4" basis)

Year	1979	1980	1981	1982	1983	1984	1985	1986
Production Capacity	430	430	460	530	550	630	710	730
Total Shipments	397.4	408.9	394.1	324.1	399.0	464.8	581.6	630.6
% Utilized	92.4%	95%	85.6%	61.1%	72.6%	73.8%	81.9%	86.3%
Exports	42.7	64.2	51.3	68.3	77.1	104.5	126.1	125.5
% Exports	10.7%	15.7%	13.0%	21.8%	19.3%	22.5%	21.7%	19.9%
Total Canadian Shipments	354.7	344.7	342.8	255.8	321.9	360.3	455.5	505
			U.S.A.					
Total U.S. Shipments	3376	2949	2869	3393	3009	3195	3330	3602
Shipments Including Canadian Imports	3418	3013	2920	2461	3086	3299	3456	3727
Ratio Canadian Imports to Total U.S. Consumption	1.2%	2.1%	1.7%	2.7%	2.5%	3.2%	3.7%	3.4%

Total Canadian shipments have increased by 60% since 1979, from 397.4 to 630.6 million sf/year on a 3/4" basis. Exports to the U.S. during that period have almost tripled, going from 42.7 million sf in 1979, to 125.6 million SF in 1986. Canadian particleboard now supplies 3.4% of the U.S. market, compared to 1.2% in 1979.

There is still excess production capacity available, with the Canadian industry operating at 80 - 85% capacity. Shipments to the Canadian market place remained in the 350 million sf/year range from 1979 to 1984. Shipments rose substantially in 1986, to 505 million sf/year.

(1) Source: Statistics Canada

3.3.10 Regional Demand

The overall Canadian demand/supply situation shows excess capacity in all regions, with the industry being dependent upon exports to the U.S. to ensure its viability.

Table 3.16

1986 Canadian Demand/Supply Particleboard (1)

(million sf- 3/4" basis)

	West	Ontario	Quebec	Atlantic	Export	Total
Demand	69.1	236.3	199.1	(3)	125.6	630
Supply	116	246	309.7	40		712
Available For Export	46.9	10	110.6	40	207.5	

Canadian domestic particleboard shipments are projected to rise from current levels of 500 MSF to 715 MSF by the mid 1990's.

Projected Canadian Particleboard Shipments (2)

1987 - 1995

(billion sf - 3/4" basis)

Year	1987	1989	1991 - 1995
Industrial	.428	.477	.558
Residential	.046	.046	.046
Non-Residential	.012	.013	.014
Repairs/Alteration	.085	.090	.097
Export	.123	.119	.121
TOTAL	.694	.745	.836

(1) Source: Statistics Canada
(2) Source: RIS
(3) Included in West

The National Particleboard Association lists shipments from plants in the South/East and the West.

Regional shipment figures from the U.S. West and South/East show that in the last 8 years, 44.8% of U.S. production has originated in the west.

Industrial grade particleboard made from western softwood species is more highly regarded and gets a better price then particleboard made from eastern and southern softwood or hardwood species. Historically, over half of the western particleboard output is sold to industrial end users east of the Mississippi River.

Regional Particleboard Shipments (1)

1979 - 1986

(bsf - 3/4" basis)

Year	U.S. West	U.S. South/East	Total
1979	1.533	1.842	3.376
1980	1.271	1.678	2.949
1981	1.236	1.632	2.869
1982	.961	1.431	2.393
1983	1.287	1.721	3.009
1984	1.531	1.664	3.195
1985	1.547	1.783	3.330
1986	1.700	1.902	3.602

Projections of particleboard shipments for the period of 1987 to 1995 show modest growth in the industry.

Projected USA Particleboard Shipments (2)

1987 - 1995

(billion sf - 3/4" basis)

Region	1987	1989	1991 - 1995
West	.76	0.78	0.81
South	1.29	1.43	1.51
North Central	0.90	0.92	0.92
North East	0.56	0.56	0.55
Export	0.16	0.19	0.23
	3.67	3.88	4.02

(1) Source: National Particleboard Association
(2) Source: RIS

The overall supply/demand situation for North America looks stable for the next decade. With an installed production capacity of 4.8 billion sf by 1988, the industry is well positioned to look after projected demand to the mid 1990's.

3.3.11 Particleboard Supply/Demand - Eastern North America

The market for a plant located in New Brunswick will be in the Eastern portion of North America.

Eastern North America

Particleboard Production Capacity

(billion sf - 3/4" basis)

		1986	1988
Canada		0.595	0.595
USA	North East	-	.170
	North Central	.303	.303
	South	1.749	1.909
TOTAL		2.647	2.977

Over the past 10 years, total demand for particleboard in Easthern North America has remained fairly constant at 2.7 to 3.0 billion sq. ft./year, 3/4" basis. In 1986, this increased to 3.3 billion sq.ft./year. Total production capacity in the region stands at 2.7 billion sq.ft./year. Three new plants (Pennsylvania, Virginia and North Carolina) under construction will bring this total capacity to approximately 3.0 billion sf/year.

Particleboard

Projected Demand, 1987 - 1995 (1)

Eastern North America

(billion sf / 3/4" basis)

		1987	1989	1991 - 1995
Canada		.696	.745	.836
USA	North East	.560	.560	.550
	North Central	.900	.920	.920
	South	1.290	1.430	1.510
TOTAL		3.446	3.655	3.816

Demand in Eastern North America is projected to increase to 3.8 billion sf/year by the mid 1990's. Supply capacity from regional mills of 3.0 bsf plus historical shipments of 0.8 - 0.9 bsf from western mills will certainly look after immediate needs.

Looking more closely at the North Central U.S. and North East U.S. region, and Eastern Canada, the present installed capacity is 1.1 billion sf/year. With additional capacity coming on steam, this rises to 1.4 billion sf/year by 1988.

Current demand is estimated at 1.8 billion sf. Maximum demand over the next decade is estimated at 1.9 to 2.0 billion SF.

The regional deficit is expected to be in the 0.5 billion sf/year range by 1990. The US North East has always been a net importer of particleboard. A new plant built in the region, would have to compete with older mills in the south and west, which have mills operating with far lower debt load, and therefore able to operate at lower sales prices to meet overhead costs.

(1) Source: RIS

3.4 Medium Density Fiberboard (MDF)

3.4.1 Introduction

Medium density fiberboard (MDF) is a reconstituted panelboard produced by reducing wood to individual wood fibres utilizing pressurized refining techniques and blending them with synthetic resins. As the board features excellent edge tightness, machinability and a good surface for laminating and finishing, MDF is well suited for high quality furniture manufacturing. Nearly 100 percent of the MDF manufactured is used in the cabinet and furniture manufacturing industry.

3.4.2 Demand

The North American medium density fiberboard industry has seen modest increases in demand, with compound growth rate in shipments 6.4% per year over the period 1979 to 1986. By comparison, the particleboard industry grew at 1.7% per year, waferboard/OSB, 29.8% per year.

Shipments of Medium Density Fiberboard (1)

U.S., 1975 - 1986

Year	Production MDF 3/4" Basis (MSF)
1975	215,496
1976	280,036
1977	441,354
1978	508,416
1979	506,728
1980	493,140
1981	516,102
1982	446,157
1983	604,323
1984	634,974
1985	684,593
1986	780,598
1995	1,243,000 est.

3.4.3 Price Levels

Since 1975, price levels have increased from $177 U.S./thousands sq. ft. to $342 or an overall increase of 93%. Prices for particleboard have increased comparatively, ranging from $108 in 1975 to $213 in 1986, a change of 97%.

(1) Source: National Particleboard Association

Actual average prices of MDF (F.O.B.) mill in thousands of sq. ft. (3/4" basis) are as follows:

Average Price (F.O.B. Mill), MDF

U.S. Dollars/MSF, 3/4"

1975	$177 (U.S.)
1976	195
1977	205
1978	226
1979	270
1980	294
1981	340
1982	324
1983	328
1984	341
1985	354
1986	342

MDF costs more to manufacture than particleboard and commands a premium price.

3.4.4 Demand Factors

There are many factors which influence the future market consumption of MDF. Some of these are:

- housing starts
- demand for furniture and cabinets
- price of competitive products such as plywood and lumber, particleboard
- formaldehyde emission standards
- new developments for produce use - such as moldings, exterior siding
- import competition for furniture
- increasing use of lamination in furniture
- continued emphasis on business furniture market, eg. computer furniture
- growth in the do-it-yourself market.

3.4.5 Furniture and Fixtures Manufacturing

As noted in the section on particleboard, the interior panels market, and especially MDF, is highly dependent on the furniture market. Furniture production in the U.S. has decreased, partially due to strong imports from Taiwan, Korea, Scandinavia and Mexico. MDF has made inroads into particleboards tradional markets, thus creating market share.

The penetration of MDF in this market will depend upon the premium charged for MDF and the availability of cost efficient MDF plant capacity.

A review of shipment data published by the National Particleboard Associaton shows that MDF has increased its share of the total industrial panel market from 23.2% in 1979 to 25.8% in 1986. MDF's average share over the period was 25%.

Combined Shipments - U.S.A.

Industrial Panelboard

Year	P.B.	MDF	Total	% MDF/Total
1979	1675	506	2181	23.2
1980	1501	493	1994	24.7
1981	1531	516	2047	25.2
1982	1306	446	1752	25.4
1983	1730	604	2334	25.7
1984	1943	634	2557	24.6
1985	2015	685	2700	25.3
1986	2239	780	3019	25.8

3.4.6 MDF Manufacturing Capacity

After dramatic particleboard and MDF capacity increases in the early 1970's, the industry did not add much capacity. Recent capacity additions in the 1980's concentrated on MDF plants, with new plants opening in New Mexico, California, Michigan, New York, Alberta, and North Carolina.

The industry will probably face a period of overcapacity, unless there are new markets developed, or an increase in demand for furniture.

The list of existing MDF facilities in the United States, plus plants under construction in Canada and the U.S. follows.

NGM INTERNATIONAL

Present and Planned Capacity - MDF Plants - May, 1987

			Capacity - Million Sq. Ft./Year - 3/4" Basis
Medium Density Fiberboard - United States			
1.	Bassett Industries	- Bassett, VA.	22
2.	Bohemia Inc.	- Rocklin, Calif.	80
3.	Celotex Corp.	- Marion, S.C.	70
		- Sellers, S.C	57
4.	Georgia-Pacific Corp.	- Holly Hill, S.C.	82
5.	Louisiana-Pacific Corp.	- Clayton, Ala.	65
		- Eufala, Ala.	70
		- Oroville, Calif.	50
		- Newberry, Mich.	52.5
6.	Masonite Corp.	- Spring Hope, N.C.	70
7.	Medford Corp.	- Medford, Ore.	88
8.	Montana De Fibra	- Las Vegas, N.M.	84
9.	Plum Creek Timber Co. Inc.	- Columbia Falls, Mont.	79
10.	Weyerhaeuser Co.	- Moncure, N.C.	70
		- Craig, Okla.	75
11.	Willamette Industries Inc.	- Malvern Ark.	50
	TOTAL		1064.5
Plants Under Construction - United States			
12.	Louisiana-Pacific	- Urania, Louisiana, 1987	45
		- New Waverly, Texas (80,000 m^3/yr each)	45
13.	Rein Corporation	- Mobile, Alabama	50
14.	Willamette Industries	- Malvern, Arkansas, 1987	50
	TOTAL UNDER CONSTRUCTION		190
Medium Density Fiberboard - Canada			
15.	Blue Ridge Lumber	- Whitecourt, Alberta	50
Plants Under Construction - Canada			
16.	Panfibre	- Mont Laurier, Quebec, 1987	68
	TOTAL - CANADA		118

3.4.7 The Canadian MDF Industry

Up to now, the Canadian demand for MDF has been supplied from the U.S. By the end of 1987, there will be two MDF mills in operation in Canada.

At full capacity, Blue Ridge Lumber will produce 50 million sq. ft. of 3/4" board destined primarily for North American markets but also the Far East. Blue Ridge states that the economics of the project were strengthened by their ability to make use of captive, low-cost by-products and residuals. The plant was also constructed next to an existing sawmill and shares some of the fixed overhead costs such as the office, mobile shop and other parts of the maintenance system, already in place.

A second Canadian plant is underway at Mont Laurier, Quebec and is expected to start up in September 1987. The expected capacity is 120,000 m^3/year (68 mmsf - 3/4" basis).

The newly developed plants in Canada will service the Central Canadian furniture market with excess production shipped primarily to the U.S..

3.4.8 Regional Demand

The overall North American demand for MDF stands at almost 800 million sf/year (3/4" basis). The national demand has increased at 6.4% per year since 1979. Current installed capacity is at 1.0 billion sf/year. Total shipments are projected to rise to 1.3 bsf by 1995, with 0.18 bsf estimated for export purposes.

North American MDF Consumption [1]

1985 - 1995

(Billion SF - 3/4" Basis)

	1985	1987	1989	1991-95
U.S.A.				
NE	.061	.074	.078	.099
NC	.134	.159	.174	.213
South	.345	.365	.414	.481
West	.121	.138	.146	.194
Export	.054	.086	.101	.137
Total U.S.A.	.716	.822	.913	1.124
Canada				
Canada	.022	.044	.076	.142
Export	----	.008	.021	.045
Total Canada	.022	.052	.097	.187
Total North America	0.738	0.874	1.01	1.311

Total supply is estimated at 1,372 billion sf by 1987. This means that the existing market can be served by the existing industry, assuming these estimates are correct.

(1) Source: RIS

MDF Supply

North American - 1987

(Million SF - 3/4" Basis)

	U.S.A.	Canada	Total
West	372.0	50	422.0
South	640.0 190.0 830.0	---	830.0
East	---	68	68.0
N.C.	52.5	---	52.5
	1254.5	118	1372.5

As with the other two scenarios (PB and OSB) and MDF mill located in New Brunswick must have export markets to the United States to survive.

3.4.9 MDF Supply/Demand - Eastern North America

A review of the supply/demand model for MDF in Eastern North America shows a surplus of .36 bsf, mainly from overcapacity in the U.S. south. There is also an oversupply in the U.S. west, of 0.23 bsf.

MDF Supply/Demand

Eastern North America (1987)

		U.S.A.	Canada	Total
East	D	-0.074	-0.044 (includes West)	
	S	---	0.118	
N.C.	D	-0.159	---	
	S	0.0525	---	
South	D	-0.365		
	S	0.83	---	
Total		0.2845	0.074	0.3585

Looking more closely at the U.S. North Central/North East and Canada (1987), there is a projected demand of 0.277 bsf, and potential supply from within the region of 0.170 sf, with a net deficit of 0.107 bsf/year. There is more than adequate surplus capacity in the adjacent South Atlantic states (North Carolina, South Carolina, Virginia) which can satisfy this demand.

3.4.10 Combined Shipments - MDF and Industrial Particleboard

Because MDF and industrial particleboard supply the same end market (furniture and fixtures) one should also look at the combined supply and demand model for Eastern North America.

Combined Shipments - Industrial Board

1979 - 1986, 1995 projected

(Million SF - 3/4" Basis)

U.S. South/East

	P.B.	MDF	Total	% - MDF
1979	768	299	1067	28%
1980	718	307	1025	29.9%
1981	761	329	1092	30.2%
1982	689	300	989	30.3%
1983	892	394	1286	30.6%
1984	932	405	1337	30.3%
1985	1003	413	1416	29.2%
1986	1097	478	1575	30.3%
Projected 1995 (using historical growth rates)	1415	668	2083	
	274	125	399 (From West)	
	TOTAL 1995		2482	

Projected annual demand for all industrial board for the Eastern U.S. is 2.48 bsf, with 2.09 to be shipped from within the region. The supply/demand situation would be as follows:

North America

Combined Supply/Demand - Industrial Board (1989)

		U.S.A.		Canada		Total
		PB	MDF	PB	MDF	
	D	-0.44	-0.146	-0.06	-0.016	-0.662
West	S	1.06	0.372	0.116	0.05	1.598
	Net	+0.62	+0.226	+0.056	0.034	+0.936
	D	-1.65	-0.66	-0.57	-0.06	-2.94
South/	S	1.18	0.88	0.6	0.068	2.73
East	Net	-0.47	+0.22	+0.03	-0.008	-0.21
Net Supply/ Demand		0.15	0.446	0.086	0.024	0.724 bsf surplus

By 1989 it is expected that there will be a national surplus of 0.724 bsf in industrial board (particleboard and MDF). There is a net surplus in the west of 0.936 bsf, and a net deficit in the east of 0.210 bsf.

Long term, there appears to be some opportunity to build an MDF or industrial grade particleboard plant to serve the North East. In the immediate near future, there will be a period of overcapacity. It will take a while for newly opened plants to work up to full capacity, and for the market to adjust to the capacity.

4.0 Plant Capacities, Descriptions and Raw Material Requirements

4.1 Oriented Strand Board Plant

The plant size under consideration in this study is the minimum economical sized plant, optimized for a single line flake preparation process. The press size for a balanced plant of this type is a nominal 8' x 16' x 9 - opening, capable of 122,000 m^3/year (138 MMSF/yr, 3/8" basis) production rates.

The design criteria for the plant is based on the following assumptions:

Operating Days/year	= 350
Operating Shifts/week	= 20
Effective Operating hrs/day	= 22
Unexpected Downtime Loss	= 10% of Effective oper.hrs.
Resin and Cure Rate	= Powdered Phenolic @ 17 sec/mm
Cumulative Net Operating hrs/yr	= 6666
Board Density	= 641 kg/m^3 (40 PCF)

Raw material requirements for this plant would consist of:

Wood	= 244,000 m^3/yr.
Wax	= 1,286 Tonnes/Year
Powdered Phenolic Resin	= 2,144 Tonnes/Year

Note: Trim losses and reject boards included in above at 7 1/2% and 2% respectively.

Following is a general description of the proposed plant:

4.1.1 Site

The plant site and building location should be selected to use the natural grade as much as possible. Maximum yard grades of 3% should be maintained in order to allow easy movement of mobile equipment. After rough grading, all work areas should be surfaced with suitable granular material, in thicknesses required to provide satisfactory working surfaces but generally not less than 1 foot in thickness.

Asphalt and concrete paving will be used to surface the main plant access road, parking lot and shipping areas. All other roads and yard areas will be gravel surfaced.

The proposed plant siting assumes rail service, and estimates for a 1,200 ft. rail spur servicing the plant are included.

Grading in the area of the plant and woodyard will be completed so that all drainage will be carried to collecter ditches for discharge from the site. Suitable perimeter ditching will be provided to divert drainage from surrounding areas away from the plant site.

The complete plant will be protected by a primary fire protection loop, with hydrants around the outside of the building, as well as a sprinkler system.

The majority of yard areas will be lighted from yard lights mounted on the exterior walls of the building. Additional lighting as required will be provided for the plant entrance, parking lot areas and woodyard operations from pole mounted flood lights.

4.1.2 Wood Receiving

Wood will be received primarily in log length by truck for all loading and storage in the woodyard. The loader will then deposit the log length (100 inch) logs into the plant hot ponds.

Adequate yard storage will be provided for ten weeks storage for the plant to cover the spring break-up when roads are closed or load limited.

4.1.3 Woodhandling

Logs placed in the plant hot ponds are moved through the ponds to the jackladders by the force of the new incoming logs displacing them toward the outfeed end. In addition, log forwarding devices will be provided on the hot ponds to assist movement of the logs to the jackladders. Water temperatures are maintained in the hot ponds by a system of pumps, strainers, heat exchangers and recirculation.

Following the hot pond jackladders, the logs will advance in single file through a mechanical ring type debarker, to remove bark prior to processing. The bark removed is collected and forwarded to the plant heat energy system.

After debarking, the round wood will be conveyed to the slasher deck for further breakdown to nominal 50 inch bolt length. Fifty inch bolts will be discharged from the slasher to a random short surge bin.

4.1.4 Flaking and Wet Flakes Storage

The 50 inch bolts will be reclaimed from the random log storage bin for delivery to the feed decks ahead of the disk flaker. Both surface layer and core layer flakes will be produced on a single flaker. The flakes will be mechanically conveyed to the wet flake horizontal storage bin located above the flake dryer. The wet flake storage is arranged to provide a first-in/first-out delivery of flakes to the dryer. The outfeel section of the wet flake bin provides a controlled flow to the infeed of the flake dryer.

4.1.5 Drying and Screening

Flakes will be dried in a direct fired 3-pass rotary type dryer, which will reduce the moisture content of the flakes to approximately 4% moisture content O.D.B. (Oven Dried Basis). Heat for the dryer will be provided by a high intensity dry fuel suspension burner, which will burn dry waste from the trim and screening system.

Flakes will be discharged from the dryer through a cyclone to remove the dried flakes from the air stream. Particulate matter will be removed by high efficiency cyclones and the gases will be released to the atmosphere.

Dried flakes will be discharged to a rotary type dry screen where fines will be removed and flakes directed to the surface and core layer dry flake bins.

4.1.6 Dry Storage and Blending

The dry flake bins are similar to the wet flake storage bins with the outfeed sections being controlled in accordance with the process requirements of the forming line. Dry flakes will be fed to each of the two blenders where wax and phenolic resins will be added at a controlled rate. The blending system will consist of two large diameter rotary drums, in which the flakes will be tumbled in an atmosphere of powdered dry phenolic resin after having been sprayed with hot molten wax. Provision is made in the blending system for the future addition of liquid resins to the process.

After blending, the flakes will be conveyed to the mat formers. The core layer and surface layer flakes will be directed to the surge hoppers located in the forming heads over the forming line.

Phenolic resin will be delivered to the plant in bulk containers and stored in the resin storage area. The bulk containers will be hoisted above the metering hopper by means of an electric hoist and the dry phenolic resin will be conveyed to the blenders.

4.1.7 Forming

The discharge from the forming heads will be accurately controlled in accordance with the volume and weight of the dry flakes to give the proportion of surface layer material and core layer material desired for the product being manufactured. The formed mats will be fed continuously down the forming line and will be separated into nominal 8' x 16' mats by a travelling cut off saw and delivered to the press loader. A mat reject system is provided ahead of the press loader to convey rejected mats back to the core layer forming head hopper in the event that the forming stations are not operating within the desired tolerances. Mat side trim saws will trim the formed mat to minimum tolerances. This material together with the cut of saw material will be returned to the core formers.

4.1.8 Pressing

The formed mats will be deposited on the tray belts of the press loader for simultaneous introduction into the hot press. At the time of introduction of these mats to the press, the pressed boards from the press will be removed to the press unloader. The press system will include the necessary hydraulic equipment, heated oil circulating system and controls to manufacture the product as desired. The press will be designed with an effective mat pressure of 750 psi. This will provide a capability to produce board with a substantial density profile.

4.1.9 Trim, Grade and Strapping

The finished rough boards will be removed from the press by the press unloader and passed across the board scale where the weight can be checked for manufacturing tolerances. From the scales, the boards will travel through a trim saw where they will be cut into 4' x 16' panels and then cross transferred; where the 4' x 16' panel will be reduced to two 4' x 8' panels.

The trimmed boards are then passed over a mirror grade station prior to stacking in one of three bins. The grade bins will provide for No. 1, No. 2 and reject boards. From these bins, the accumulated stacks will be transferred to the semi-automatic strapping line for strapping and delivery to the warehouse.

4.1.10 Heat Energy System

Fines from the dry screening operation and trim from the hogging saws on the board trim system will be conveyed pneumatically to a dry fuel hammer mill for reduction to a size suitable for burning in the high intensity burners on

the dryers. Included in the dryer fuel system will be a pick-up from the plant dust collection system, which directs all wood dust to the dryer fuel system.

The heat for the hot press, hot pond heat exchangers, and building air make-up units will be provided by a wet fuel burning thermal oil heating system. Bark and wood waste from the slashing and debarking operations will be conveyed to a bark hog for reduction to a size suitable for burning. From the hog, the wet fuel will be directed to the wet fuel storage bin, which will provide approximately 10 hours of fuel storage for the thermal oil heater at maximum firing rate. The fuel will then be burned in a combustion chamber and the hot gases passed through a thermal oil heater. Hot thermal oil will be circulated throughout the plant as required.

Particulate in the flue gas from the thermal oil heater will be removed in an electrified filter bed precipitator and the clean flue gases will then be discharged by a stack to atmosphere.

4.2 Particleboard Plant

As with the OSB plant, the particleboard facility is being considered as a minimum entry installation, the annual capacity being 106,000 m^3/yr (60 MMSF/yr, 3/4" Basis) which puts it in the same range as the OSB installation. This size was chosen in part because NGM has reliable data on plant costs in this size range. Economical plants range from the size to as large as 270,000 m/yr. A 106,000 m^3/yr plant has the advantages however of low capital cost, relative ease of operation, a single line process, expandability, a moderate draw on wood reserve and a reasonable production rate.

The design criteria for the plant is based on the following assumptions:

Press Size	5' x 18' x 10 openings
Board Thickness Range	6 mm - 38 mm
Density	722 kg/m^3 (45 PCF)
Resin & Cure Rate	Liquid Urea Formaldehyde @ 18 sec/mm

Cumulative Net Operating Hours/Year = 6666

The raw material requirements for the plant for normal yearly production would be:

Wood	159,000 m^3/yr, roundwood, shavings, sawdust
Glue (@ 9%)	6,900 Tonnes/yr.
Wax (@ .8%)	614 Tonnes/yr.
Catalyst (@ .25%)	192 Tonnes/yr.

It should be noted that the best quality particleboard is produced from "engineered flakes" derived from flaking roundwood. However in the event that sawmill shavings and sawdust may be reasonably available, that furnish may be utilized to produce an acceptable product at a lower raw material cost.

Following is a general description of the proposed plant.

4.2.1 Site

Site description generally as for the OSB plant described in Section 4.1.1.

4.2.2 Particle and Flake Preparation

The basic plant design allows for the utilization of round wood as well as sawdust and shavings as the furnish for the plant.

Roundwood up to a maximum diameter of 24" would be debarked thus providing a source of fuel for the plant heat energy system, and providing high quality wood furnish for the particleboard plant raw material. A minimal hot pond system is provided to allow for thawing the bark prior to removal.

Following the debarking, the logs are fed into a U-type flaker for size reduction.

As there is expected to be as supply of shavings and sawdust, provision has been made for equipment to unload, store and feed this material.

Flakes, shavings and sawdust are then sized in refiners to obtain the required size distribution of the wood.

After refining, the wood is stored in a wet silo for infeed to the dryer.

The wet silo is designed to provide 200 cubic meters of storage between the flaking and the drying sections of the plant. This allows for a controlled feed to the dryers and a buffer period for downtime to change flaker knives without interrupting the process flow.

4.2.3 Drying, Screening, Milling and Shifting

From the wet silos, the particles are transferred to a direct fired rotary dryer. The particles are dried to a final moisture content of 3 to 4 percent on an oven dried basis. The dryer is designed to handle moisture contents of up to 120 percent on an oven dried basis in the input material to the dryers.

The dried particles are fed from the dryer to a two-stage air sifter, which classifies the particles into a surface layer fraction and a core layer fraction. In order to control a set balance between surface layer and core layer required by the downstream process, the air sifter is adjusted automatically to separate at appropriate levels. Screens also separate oversized surface layer and core layer material for secondary milling to further control the sizing of the furnish by surface area, since the previous separation by air sifting is relative to flake thickness only.

The dry silos provide a buffer storage of 200 cubic meters for both surface layer and core layer material.

4.2.4 Blending

The glue preparation area (glue kitchen) provides all the necessary equipment for the preparation of the resin prior to blending it with the particle furnish. Liquid Urea Formaldehye resin is blended in proper proportion with water, catalyst and wax.

Water is added to the resin in order to achieve a proper solids level, usually around 50 percent, to optimize even resin distribution. A catalyst in the form of hardener such as Aluminum Chloride and at times a buffer such as Aqua Ammonia is added to the resin to control cure rates in the hot press and prevent precure. Wax in the form of an emulsion is added, either mixed with the resin or introduced separately to the blender, as a sizing agent to improve the moisture resistance of the particleboard.

The proposed blenders are the turbo-blender type with metering systems for the particles and additives.

There is a continuous flow of particles from the dry silo through to the forming station via the blenders. The blending system is complete with instrumentation to allow precise metering of the wood flow with resin, catalyst and wax blended automatically to the correct proportions for high quality particleboard production, while maintaining economical resin levels.

4.2.5 Forming and Pressing

Three (3) forming machines are utilized to provide the formation of the 3-layer mat. Resinated particles are evenly distributed over the entire width of the forming stations, forming first the bottom surface layer of the board, then the center core layer, and finally the top surface layer.

From the forming machines, the particles are spread uniformly onto the cauls which travel beneath the forming stations. The material for the bottom surface layer is first

deposited onto the cauls in such a way that the spread particles are progressively graduated from fine to coarse resulting in a surface with super fine particles. The core layer stock is next deposited at random resulting in a core layer of homogeneous mixture. The stock for the top surface layer is deposited last in a similar fashion to the bottom surface layer with the finer particles on the exterior surface.

The final design of the plant may utilize a continuous type forming line as opposed to the caul system described, in which case the forming stations will be followed by a flying cut-off saw to cut mats to the proper size for introduction to the press.

The formed mats are fed continuously into an indexing loader immediately prior to the press. Following the filling of the loader, the ten (10) formed mats are introduced simultaneously into the hot press for pressing to final thickness.

The hot press is a 5 ft. x 18 ft. - 10 opening press designed for a specific mat pressure of 500 psi, and heated by thermal oil to between 300 - 350^{o}F.

The unloader section immediately following the press is of similar design to the loader device and withdraws all ten (10) mats simultaneously from the press and conveys the rough mats in a continuous manner to the trimming and stacking area.

4.2.6 Trimming and Stacking

The press boards are separated from the cauls and transferred onto a weigh scale. The empty cauls are returned under the press for recycling through the forming area.

Following the weigh scale, boards are passed through a board cooler section prior to trimming and stacking in the warehouse.

Trimmed and stacked bundles of particleboard are moved by lift truck to the curing area of the plant where they remain for a minimum of 3 days for conditioning.

4.2.7 Standing

Following final curing of the particleboard in intermediate storage, the boards are taken by lift truck to the sanding line for calibration of thickness and smooth surfacing.

A top/bottom dual head, wide belt sander is used to first calibrate the boards to a thickness tolerance of ± .12

millimeter or ± 0.0005 inch and then the boards are smooth surfaced with an 80 to 100 grit finish.

From the sanding line, the boards ae transported by lift trucks to the warehouse or directly loaded for shipment to market.

4.3 Medium Density Fiberboard Plant

The MDF plant will have an annual production capacity of 94,000 m^3/yr (53 MMSF/yr, 3/4" Basis). As with the particleboard plant, this plant size offers similar advantages for the new manufacturer.

The design criteria for the plant is based on the following assumptions:

Press size	= 5' x 18' x 12 openings
Thickness Range	= 6 mm - 38 mm
Density	= 754 kg/m^3 (47 PCF)
Resin and Cure Rate	= Liquid Urea Formaldehyde @ 23 sec/mm
Cumulative Net Operating Hours/Year	= 6666

Raw Material requirements for the plant for normal yearly production would be:

Wood	= 141,000 m^3/yr, roundwood, shavings, sawdust
Glue (@ 9.5%)	= 6700 Tonnes/yr.
Wax (A .5%)	= 354 Tonnes/yr.
Catalyst (@ .25%)	= 177 Tonnes/yr

Following is a general description of the proposed plant:

4.3.1 Site

Site description, generaly as for the OSB plant described in Section 4.1.1.

4.3.2 Wood Supply

Round wood will be hot ponded, debarked and then flaked in U-type flakers to provide raw material for the refiners. Sawdust and shavings from adjacent sawmills will also be used.

The wood (sawdust, shavings and flakes) will be stored in a 200 m^3 metering bin to feed the presteamer-refiner system.

4.3.3 Presteamer - Refiner System

There will be one refiner with a 44 inch disc to produce approximately 11 tons of fiber per hour.

The refiner will operate on shavings, sawdust and flakes.

There will be a 3 unit metering bin directly feeding the presteamer to assure a smooth even feed rate. The presteamer feed screw will be driven by a D.C. motor to assure a continuous variable feed rate.

The presteamer will have a gamma guage level control to adjust the steaming time. The steam to the refiner will be 100 psi and the steam flow is approximately 5.5 ton per hour, or 0.5 lbs steam per lb of fiber.

The refiner will have one 44 inch stationary disc and one 44 inch rotating disc. Power will be supplied by a 3,000 HP water cooled motor.

The refined fiber will be discharged through a 6 inch blow line directly into the flash tube dryer. Resin will be added directly to the blow line.

4.3.4 Resin and Wax System

Wax is added directly to the chip infeed to the presteamer. Approximately 0.5% wax is used to retard water absorption in the finished panel during shipment or storage of the MDF panel.

Resin is added directly to the blowline between the refiner and the flash tube dryer. If resin is added after the dryer the fiber must be dried to under 5% MC and a fiber scrubber will be required on the dryer. Approximately 9.5% resin solids will be used.

The wax and resin addition rates will be controlled by a weigh scale on the outfeed of the dryer system between the dryer and the fiber storage bins. There is approximately 5 seconds delay time between resin addition and the fiber weigh scale.

4.3.6 Flash Tube Dryers

The fiber is dried in a flash tube dryer. This dryer has a tube 67 inches in diameter and approximately 250 feet long.

The heat source will be an indirectly fired wood waste burner. The heat required is 1,800 Btu per lb. of water evaporated including water added with the resin but not including the water with the steam to the refiner. Air velocity in the tube is 4,000 - 5,000 fpm at a discharge temperature of 180^{0}F.

A high efficiency cyclone is used to collect the fiber and drop the fiber onto a conveyor belt. If resin has been added to the blow line before drying, the exist moisture content will be 10% and a fiber scrubber is not required.

4.3.6 Fiber Metering Bins

The fiber metering bin is used to supply a small surge capacity and compensate for any fluctuations in the presteaming-refining system. One bin is used, the outlet is divided to two forming heads.

The fiber bulk density at this point is approximately 1.5 lbs per cubic foot. With a feed rate of 25,142 lbs per hour or 419 lbs per minute, a 15 minure surge capacity requires a metering bin of 4,200 cubic feet. The usual size of the fiber bin is 20 to 30 units.

The outfeed of the fiber metering bin is split into two sections so as to divide the fiber to top and bottom heads. Fiber is transported pneumatically from the fiber bins to the forming line.

4.3.7 Forming Heads

There are two forming heads with one for the bottom layer and one for the top layer.

Each forming head consists of a method of distributing the fiber across the five foot width of the forming line, allowing free fall of the fiber, a wire screen to support the fiber and a vacuum system below the screen to compact and interfelt the fiber.

As the felted mat leaves the vacuum system a scalping roll levels the mat to even out any irregularities in the mat surface. The leveled mat then enters the next forming head and a new layer is added.

As the mat leaves the second forming head it is transferred from the wire screen and enters a pre-compressor. The mat height as it is felted is approximately 15-20 times final panel thickness. When leaving the pre-compressor it will be approximately 7-10 times final panel thickness.

The pre-compressor will have a nip roll to exert 2000 pli force, a second nip roll with 700 pli force and a long hold down section.

The mat will then pass under an electromagnet and a metal detector which can reject the mat if any metal is found. A weigh scale is used as a final check on mat weight

followed by a cut off saw to trim the mat to the required length.

An acceleration conveyor is used to separate the mats. Due to the slower line speeds with one refiner, panels up to 1 1/8 inch thick can be produced without stacking of mats.

Rejected mats are dumped to a reject hopper which returns fiber to the main fiber metering bin.

4.3.8 Press

The MDF press will be a precision press designed to apply 800 psi to the mat and hold the thickness within precise limits while the resin is cured. The press shall be based on a caulless system.

The press will have variable thickness control on each cylinder and shall be equipped with a simultaneous closing system.

The press will be heated with hot oil with a themal oil temperature drop of no more than $100^{o}F$ at $425^{o}F$ press temperature.

4.3.9 Press Unloading and Panel Cooling

The panels shall be discharged from the press into the press unloader as the next load enters the press. There will be one storage conveyor incorporating a weigh scale as the panel leaves the press.

The pressed untrimmed panels will enter a cooling wheel which will hold two press loads.

Panels leaving the cooling system will be stacked and stored for three days before being sanded and finally cut to size for shipment.

4.3.10 Sander

The sander shall have 6 heads, the first two are opposed and are used to remove the bulk of the oversize thickness.

The second heads are offset and size the panel to final thickness or about .010 inch oversize.

The third set of heads are also offset and are used to remove the sanding marks from the first four heads and to reach final thickness.

The sander is capable of removing 0.100 inch of material from 3/4 inch panels at line speeds of 120 ft. per minute.

Sanding will be done before the final trim saws.

4.3.11 Final Trim Saws

The final trim saws are precision saws. They are not however, designed to have full cut-to-size capability. They will be able to supply a centre rip cut and two centre cross cuts on a 5 ft. x 18 ft. panel.

The cut-to-size line will have full cut-to-size capabilities.

4.3.12 Warehouse

The warehouse will be designed to hold five days of rough unsanded panels. The warehouse will be designed to clear-span to a center row of building columns.

Final storage capacity for finished panels awaiting shipment will be approximately 30 days.

5.0 Preliminary Construction Cost Estimates

5.1 OSB Plant Capital Costs

5.1.1 Summary

Following is a summary of the capital cost estimates for this size of plant.

AREA	ITEM	ESTIMATE
01.	Site	$900,000
02.	Buildings & Foundations	$6,400,000
03.	Mobile Equipment	$575,000
04.	Wood Receiving & Slashing	$700,000
05.	Wood Handling	$1,245,000
06.	Flaking & Wet Storage	$1,020,000
07.	Drying	$1,600,000
08.	Dry Storage & Blending	$1,372,000
09.	Forming & Pressing	$6,020,000
10.	Trim & Grade	$850,000
11.	Heat Energy System	$2,000,000
12.	Maintenance, Office & Lab Equip.	$185,000
13.	Electrical	$2,600,000
14.	Installation	$3,875,000
15.	Manufacturers' Representatives	$200,000

16.	Engineering & Project Management	$2,100,000
17.	Spares	$500,000
	Subtotal	$32,142,000
	Contingency and Escalation @ 20%	$6,428,400
	Construction Interest	$1,646,957
	Project Total	$40,217,357
	USE	$40,000,000

5.1.2 OSB Plant Capital Cost Estimates

SITE

01.01	Cost of Land	
01.02	Soils and Conc. Testing	
01.03	Yard Grading	
01.04	Gravel	
01.05	Drainage and Culverts	
01.06	Paving	
01.07	Rail Siding	
01.08	Fire Mains, Pumps, Pumphouse & Resv.	
01.09	Potable Water & Sewage	
01.	Total Site	$900,000

BUILDINGS AND FOUNDATIONS

02.01	Building Enclosure	
02.02	Building Foundations & Slabs	
02.03	Fire Protection	
02.04	Equipment Foundations	
02.05	Structural Steel & Miscellaneous Metals	
02.06	Masonry	
02.07	Painting and Finishes	
02.08	Plumbing	
02.09	Lighting	
02.10	Heating, Vent & Air Conditioning	
02.	Total Buildings & Foundations	$6,400,000

MOBILE EQUIPMENT

03.01	2 - Forklift	
03.02	1 - Carry Lift	
03.03	1 - Log Loader Cat 980 C/W Attach.	
03.04	1 - Cat 980 Used Back-Up Unit	
03.	Total Mobile Equipment	$575,000

WOOD RECEIVING & SLASHING

04.01	Yard Scales	
04.02	Tanguay Loader	
04.03	Pocket Slasher & Discharge	
04.04	Waste Conveyors	
04.	Total Wood Receiving & Slashing	$700,000

WOOD HANDLING

05.01	Log Conveyors	
05.02	Debarker C/W Feed Conveyors	
05.03	Hot Pond Wood Handling Equipment	
05.04	Slasher Deck C/W Feed & Discharge Conveyor	
05.05	Random Block Tank	
05.06	Pond Heat Exchanger & Water Circulation Equipment	
05.07	Woodroom Controls	
05.	Total Wood Handling	$1,245,000

FLAKER & WET STORAGE

06.01	Flaker	
06.02	Flake Conveyors	
06.03	Wet Flake Storage Bins	
06.04	Knife Grinder	
06.05	Flaker Knives	
06.	Total Flaker & Wet Storage	$1,020,000

DRYING

07.01	Drying Systems	
07.02	Flake Conveyors	
07.03	Dry Screens	
07.04	Spark Detection	
04.	Total Drying	$1,600,000

DRY STORAGE & BLENDING

08.01	Dry Flake Storage Bins	
08.02	Blending & Dosing System	
08.03	Blender Discharge Conveyors	
08.04	Wax Storage & Handling System	
08.05	Bulk Resin Handling (Elec. Hoist)	
08.06	Control System	
08.	Total Dry Storage & Blending	$1,372,000

FORMING & PRESSING

09.01	Forming Station & Supports	
09.02	Loader	
09.03	Forming Line C/W Dist. Conv.	
09.04	Press	
09.05	Unloader	
09.06	Control System	
09.07	Mat Reject Bin	
09.08	Press Hood Enclosure	
09.09	Hydraulic Oil	
09.	Total Forming & Pressing	$6,020,000

TRIM & GRADE

10.01	Board Scale & Infeed System	
10.02	Trim Saws C/W Infeed & Discharge System	
10.03	Mirror Grade, Stack & Strap. Conveyor	
10.04	Strapping Machine	
10.	Total Trim & Grading	$850,000

HEAT ENERGY SYSTEM

11.01	Hot Oil Heating Units	
11.02	Reclaim Bin & Wood Waste Conveyor	
11.03	Hog	
11.04	Bark Storage Bin & Discharge Conveyor	
11.05	Ash Handling System	
11.06	Thermal Oil	
11.	Total Heat Energy System	$2,000,000

MAINTENANCE, OFFICE, LAB EQUIPMENT

12.01	Maintenance Shop Equipment	
12.02	Lab Equipment	
12.03	Office Equipment & Miscellaneous	
12.04	Total Maintenance, Office, Lab Equipment	$185,000

ELECTRICAL

13.01	25 KV Substation	
13.02	600V Switchgear	
13.03	Motor Control Centers	
13.04	Wire Cable & Conduit	
13.05	PLC's, Consoles (Included with Equipment)	
13.06	Miscellaneous Electrical	
13.07	Electrical Installation	
13.08	Motors (Included with Equipment)	
13.	Total Electrical	$2,600,000

INSTALLATION

14.01	Mechanical Equipment Installation	
14.02	Dust Collection System C/W Installation	
14.03	Piping System Installation	
14.04	Plant Compressed Air System	
14.05	Piping & Equipment Insulation	
14.	Total Mechanical Installation	$3,875,000

MANUFACTURERS' REPRESENTATIVES

15.	Total Manufacturers' Representatives	$200,000

ENGINEERING & PROJECT MANAGEMENT

16.01	Engineering	
16.02	Construction & Project Management	
16.03	Construction Office	
16.04	Electricity	
16.05	Office Supplies	
16.06	Office Equipment	
16.07	Telephone & Telex	
16.08	Travel Expenses	
16.	Total Engineering and Project Management	$2,100,000

SPARES

17.	Spare Parts	$500,000

5.2 PB Plant Capital Costs

5.2.1 Summary

Following is a summary of the capital cost estimates for this size of plant.

AREA	ITEM	ESTIMATE
01.	Site	$900,000
02.	Buildings & Foundations	$6,400,000
03.	Mobile Equipment	$575,000
04.	Wood Handling	$1,245,000
05.	Shavings & Sawdust Handling	$276,000
06.	Flaking & Raw Material Storage	$1,842,000
07.	Flake Preparation	$1,507,000
08.	Mat Forming & Pressing	$6,463,000
09.	Pneumatic Systems	$736,000
10.	Finishing	$1,380,000
11.	Cut to Size Line	$805,000
12.	Heat Energy System	$2,000,000
13.	Electrical Equipment	$1,116,000
14.	Installation	$4,262,000
15.	Manufacturers' Representatives	$200,000
16.	Engineering & Project Management	$2,100,000
17.	Spares	$500,000
	Subtotal	$32,307,000
	Contingency & Escalation (@ 20%)	$ 6,461,400
	Construction Interest	$ 1,496,510
	Project Total	$40,264,910
	USE	$40,000,000

5.2.2 PB Plant Capital Cost Estimates

SITE

01.01	Cost of Land	
01.02	Soils and Conc. Testing	
01.03	Yard Grading	
01.04	Gravel	
01.05	Drainage and Culverts	
01.06	Paving	
01.07	Rail Siding	
01.08	Fire Mains, Pumps, Pumphouse & Resv.	
01.09	Potable Water & Sewage	
01.	Total Site	$900,000

BUILDINGS AND STRUCTURES

02.01	Building Enclosure	
02.02	Building Foundations & Slabs	
02.03	Fire Protection	
02.04	Equipment Foundations	
02.05	Structural Steel & Miscellaneous Metals	
02.06	Masonry	
02.07	Painting and Finishes	
02.08	Plumbing	
02.09	Lighting	
02.10	Heating, Vent & Air Conditioning	
02.	Total Buildings & Structures	$6,400,000

MOBILE EQUIPMENT

03.01	2 - Forklift	
03.02	1 - Carry Lift	
03.03	1 - Log Loader Cat 980 C/W Attach.	
03.04	1 - Cat 980 Used Back-Up Unit	
03.	Total Mobile Equipment	$575,000

WOOD HANDLING

04.01	Log Conveyors	
04.02	Debarker C/W Feed Conveyors	
04.03	Hot Pond Wood Handling Equipment	
04.04	Slasher Deck C/W Feed & Discharge Conveyor	
04.05	Pond Heat Exchanger & Water Circulation Equipment	
04.06	Woodroom Controls	
04.	Total Wood Handling	$1,245,000

SHAVINGS & SAWDUST HANDLING EQUIPMENT

05.1	Shavings	
05.2	Sawdust	
05.	Total	$276,000

FLAKING & RAW MATERIAL STORAGE

06.01	Truck Scale	
06.02	Truck Dump	
06.03	Automatic Storage Reclaim System	
06.04	Storage Shed Conveyors	
06.05	Reclaim Hopper & Conveyors	
06.6	Screen Infeed Conveyors	
06.7	U-Flaker	
06.8	Screen	
06.9	Overs Conveyor	
06.10	Hammermill	
06.11	Hammermill Blow System	
06.12	Screen Outfeed Conveyors	
06.13	Miscellaneous Steel Structures	
06.	Total Raw Material Storage	$1,842,000

FLAKE PREPARATION

07.01	Distributing Conveyor	
07.02	Feed Bins	
07.03	Refiners	
07.04	Collecting Conveyors	
07.05	Exhaust Air System	
07.06	Resin System with Tanks, Pumps	
07.07	Blenders (2)	
07.08	Triple Pass Rotary Dryer System	
07.09	Spark Detection & Suppression	
07.10	Fiber Conveyors & Weigh Scales	

07.11	Miscellaneous Steel Structures	
07.	Total Fiber Preparation	$1,507,000

MAT FORMING & PRESSING

08.01	Air Classified Forming Heads	
08.02	Forming Line Caulless System	
08.03	10 Opening Hot Press	
08.04	Press Loader and Unloader	
08.05	Board Cooler and Stacker	
08.	Total Mat Forming & Pressing	$6,463,000

PNEUMATIC SYSTEMS

09.01	Spark Detection & Supression	
09.02	Trim Saw Pneumatic System	
09.03	Trim Hog Blower System	
09.04	Reject Pneumatic System	
09.05	Line Clean Up	
09.06	Press Line Ventilation System	
09.07	Sander Pneumatics System	
09.08	Sander Bag House	
09.09	Fuel Bin	
09.10	Miscellaneous Steel Structures	
09.	Total Pneumatic Systems	$ 736,000

FINISHING

10.01	Sander Infeed System	
10.02	6-Head Sander	
10.03	Sander Outfeed	
10.04	Saw Line Infeed System	
10.05	Panel Saws	
10.06	Saw Line Outfeed System	
10.07	Grade Line	
10.08	Strapping Unit	
10.09	Trim Hog	
10.10	Miscellaneous Steel	
10.	Total Finishing Equipment	$1,380,000

CUT-TO-SIZE

11.	Total Cut-To-Size Equipment	$805,000

HEAT ENERGY SYSTEM

12.01	Hot Oil Heating Units	
12.02	Reclaim Bin & Wood Waste Conveyor	
12.03	Hog	
12.04	Bark Storage Bin & Discharge Conveyor	
12.05	Ash Handling System	
12.06	Thermal Oil	
12.	Total Heat Energy System	$2,000,000

ELECTRICAL EQUIPMENT

13.01	Power Distribution	
13.02	Motor Controls and Wiring	
13.03	Variable Speed Drives	
13.04	Control System	
13.	Total Electrical Equipment	$1,116,000

INSTALLATION

14.01	Mechanical Equipment Installation	
14.02	Piping System Installation	
14.03	Plant Compressed Air System	
14.04	Piping & Equipment Insulation	
14.	Total Mechanical Installation	$3,875,000

MANUFACTURERS' REPRESENTATIVES

15.	Total Manufacturers' Representatives	$200,000

ENGINEERING & PROJECT MANAGEMENT

16.01	Engineering
16.02	Construction & Project Management
16.03	Construction Office
16.04	Electricity
16.05	Office Supplies
16.06	Office Equipment

16.07	Telephone & Telex	
16.08	Travel Expenses	
16.	Total Engineering and Project Management	$2,100,000

SPARES

17.	Spare Parts	$500,000

5.3. MDF Plant Capital Costs

Following is a summary of the capital cost estimates for this size of plant.

AREA	ITEM	ESTIMATE
01.	Site	$900,000
02.	Buildings & Foundations	$6,400,000
03.	Mobile Equipment	$575,000
04.	Wood Handling	$1,245,000
05.	Shavings & Sawdust Handling	$276,000
06.	Flaking & Raw Material Storage	$1,842,000
07.	Fiber Preparation	$1,967,000
08.	Mat Forming & Pressing	$7,648,000
09.	Pneumatic Systems	$886,000
10.	Finishing	$1,380,000
11.	Cut-to-Size Line	$805,000
12.	Heat Energy System	$2,000,000
13.	Electrical Equipment	$1,162,000
14.	Installation	$4,566,000
15.	Manufacturers' Representatives	$2,100,000
16.	Engineering & Project Management	$200,000
17.	Spares	$500,000
	Subtotal: $34,452,000	
	Contingency and Escalation (@ 20%):	$ 6,890,400
	Construction Interest:	$ 1,797.963
	Project Total	$43,140,363
	USE	$43,000,000

5.3.2 MDF Plant Capital Cost Estimates

SITE

01.01	Cost of Land	
01.02	Soils and Conc. Testing	
01.03	Yard Grading	
01.04	Gravel	
01.05	Drainage and Culverts	
01.06	Paving	
01.07	Rail Siding	
01.08	Fire Mains, Pumps, Pumphouse & Resv.	
01.09	Potable Water & Sewage	
01.	Total Site	$900,000

BUILDINGS AND STRUCTURES

02.01	Building Enclosure	
02.02	Building Foundations & Slabs	
02.03	Fire Protection	
02.04	Equipment Foundations	
02.05	Structural Steel & Miscellaneous Metals	
02.06	Masonry	
02.07	Painting and Finishes	
02.08	Plumbing	
02.09	Lighting	
02.10	Heating, Vent & Air Conditioning	
02.	Total Buildings & Structures	$3,400,000

MOBILE EQUIPMENT

03.01	2 - Forklift	
03.02	1 - Carry Lift	
03.03	1 - Log Loader Cat 980 C/W Attach.	
03.04	1 - Cat 980 Used Back-Up Unit	
03.	Total Mobile Equipment	$575,000

WOOD HANDLING

04.01	Log Conveyors	
04.02	Debarker C/W Feed Conveyors	
04.03	Hot Pond Wood Handling Equipment	
04.04	Slasher Deck C/W Feed & Discharge Conveyor	
04.05	Pond Heat Exchanger & Water Circulation Equipment	
04.06	Woodroom Controls	
04.	Total Wood Handling	$1,245,000

SHAVINGS & SAWDUST HANDLING EQUIPMENT

05.1	Shavings Equipment	
05.2	Sawdust Equipment	
05.	Total	$276,000

FLAKING & RAW MATERIAL STORAGE

06.03	Automatic Storage Reclaim System	
06.01	Truck Scale	
06.02	Truck Dump	
06.04	Storage Shed Conveyors	
06.05	Reclaim Hopper & Conveyors	
06.6	Screen Infeed Conveyors	
06.7	U-Flaker	
06.8	Screen	
06.9	Overs Conveyor	
06.10	Hammermill	
06.11	Hammermill Blow System	
06.12	Screen Outfeed Conveyors	
06.13	Miscellaneous Steel Structures	
06.	Total Flaking Raw Material Storage	$1,942,000

FIBRE PREPARATION

07.01	Feed Bins
07.02	Prestreamer Infeed Conveyors
07.03	Pressurized Prestreamer Refiner (Systems incl. 3000 HP motor)
07.04	Steam Control for Refiner
07.05	Refiner Blow Line
07.06	Resin System with Tanks, Pumps
07.07	Blow Line Blender
07.08	Flash Tube Dryer System
07.09	Spark Detection & Suppression

07.10	Fiber Conveyors & Weigh Scales	
07.11	Miscellaneous Steel Structures	
07.	Total Fiber Preparation	$1,967,000

MAT FORMING & PRESSING

08.01	Fiber Metering Bin	
08.02	Forming and Press Line (Complete with 2-head Vacuum Felter, Pre-Press, 800 psi 5' - 18" - 12 Opening Hot Press Press Loader and Unloader Board Cooler and Stacker Total Mat Forming & Pressing	$7,648,000

PNEUMATIC SYSTEMS

09.01	Vacuum Felter Pneumatic System	
09.01	Spark Detection & Supression	
09.02	Trim Saw Pneumatic System	
09.03	Trim Hog Blower System	
09.04	Reject Pneumatic System	
09.05	Line Clean Up	
09.06	Press Line Ventilation System	
09.07	Sander Pneumatics System	
09.08	Sander Bag House	
09.09	Fuel Bin	
09.10	Miscellaneous Steel Structures	
09.	Total Pneumatic Systems	$886,000

FINISHING

10.01	Sander Infeed System	
10.02	6-Head Sander	
10.03	Sander Outfeed	
10.04	Saw Line Infeed System	
10.05	Panel Saws	
10.06	Saw Line Outfeed System	
10.07	Grade Line	
10.08	Automatic Strapper	
10.09	Trim Hog	
10.10	Miscellaneous Steel	
10.	Total Finishing Equipment	$1,380,000

CUT-TO-SIZE

11.	Total Cut-To-Size Equipment	$805,000

HEAT ENERGY SYSTEM

12.01	Hot Oil Heating Units	
12.02	Reclaim Bin & Wood Waste Conveyor	
12.03	Hog	
12.04	Bark Storage Bin & Discharge Conveyor	
12.05	Ash Handling System	
12.06	Thermal Oil	
12.	Total Heat Energy System	$2,000,000

ELECTRICAL EQUIPMENT

13.01	Power Distribution	
13.02	Motor Controls and Wiring	
13.03	Variable Speed Drives	
13.04	Control System	
13.	Total Electrical Equipment	$1,162,000

INSTALLATION

14.01	Mechanical Equipment Installation	
14.02	Piping System Installation	
14.03	Plant Compressed Air System	
14.04	Piping & Equipment Insulation	
14.	Total Mechanical Installation	$4,566,000

MANUFACTURERS' REPRESENTATIVES

15.	Total Manufacturers' Representatives	$200,000

ENGINEERING & PROJECT MANAGEMENT

16.01	Engineering	
16.02	Construction & Project Management	
16.03	Construction Office	
16.04	Electricity	
16.05	Office Supplies	
16.06	Office Equipment	

16.07	Telephone & Telex	
16.08	Travel Expenses	
16.	Total Engineering and Project Management	$2,100,000

SPARES

17.	Spare Parts	$500,000

NGM INTERNATIONAL

Composite Panel Facility Feasibility Study - Phase I
North Western New Brunswick Area
For
Department of Commerce and Technology

6. Preliminary Operating Cost Estimates

6.1 OSB Plant Operating Costs

6.1.1 Summary

Annual Production = 122,000 m^3/yr (138 MMSF/yr,3/8')
Operating Days = 350 Days/Yr
Net Expected Operating Hours = 6666 Hrs/Yr (19 hrs/day)

Costs	Annual	$/$m^3$ Prod'n
Wood	4,856,000	39.80
Resin	3,068,000	25.15
Wax	555,000	4.55
Labour	3,151,000	25.83
Supplies	1,220,000	10.00
Electricity	760,000	6.23
Shipping Mtls	244,000	2.00
Supervision	492,000	4.03
Office Overhead	242,000	1.98
Insurance & Taxes	250,000	2.05
Total	$14,838,000	$121.62

6.1.2 Estimates

Wood

Delivered cost = $44/Cd
= $19.90/$m^3$ @ 2.21 m^3/Cd
Consumption = 2.0 m^3 Wood/m^3 Production
Wood Cost = $19.90 x 2.0 = $39.80/$m^3$ Production

Resin (Powdered Phenol-Formaldehyde)

Delivered Cost = $1.46/kg
Consumption (@ 2.5%) = 1.075 x 641 x .025
=17.23 kg/m^3

Where, 1.075 is factor for Trim loss,
641 kg/m is board density

Resin Cost = 17.23 x 1.46
= $25.15/$m^3$ Production

Wax

Delivered Cost = $.44/kg
Consumption (@1.5%) = 1.075 x 641 x .015
= 10.34 kg/m^3
Wax Cost = $4.55/$m^3$ Production

Labour

Total Labour Cost (from ROI Calc) = $3,151,000/yr

Unit Labour Cost = $\frac{\$3,151,000}{122,000}$

= $25.83/$m^3$

Supplies

Est. $10/$m^3$ - belts
knives
mobile fuel
lubricants
Parts

Electricity

Energy Consumption = 145 KWHr/m^3
Effective Energy & Demand Charge = $0.043/KWHr
Direct Power Cost = 145 x 0.043
$6.23/$m^3$ production

Shipping Materials

Spacer Blocks $1.00/$m^3$
Strapping and corners $1.00/$m^3$
Total $2.00/$m^3$

Supervision

Total Annual Cost from DCFROI Calc. = $492,000
Unit Cost = $\frac{492,000}{122,000}$ = $4.03/$m^3$

Office Overhead

Total Annual Cost from DCFROI Calc. = $242,000
Unit Cost = $\frac{242,000}{122,000}$ = $1.98/$m^3$

Insurance and Taxes

Estimated Total = $250,000
Unit Cost = $\frac{\$250,000}{122,000}$ = $2.05

6.2 PB Plant Operating Costs

6.2.1 Summary

Annual Production = 106,000 m^3/yr (60 MMSF/yr,3/4")
Operating Days = 350 Days/Yr
Net Expected Operating Hours = 6666 Hrs/Yr (19 hrs/day)

Costs	Annual	$/$m^3$ Prod'n
Wood	3,164,000	29.85
Resin	4,073,000	38.42
Wax	289,000	2.73
Labour	2,894,000	27.30
Supplies	1,060,000	10.00
Electricity	993,000	9.37
Shipping Mtls	318,000	3.00
Supervision	492,000	4.64
Office Overhead	242,000	2.28
Insurance & Taxes	250,000	2.36
Total	$13,775,000	$129.95

6.2.2 Estimates

Wood

Delivered cost = $44/Cd
= $19.90/$m^3$ @ 2.21 m^3/Cd
Consumption = 1.5 m^3 Wood/m^3 Production
Wood Cost = $19.90 x 1.5 = $29.85/$m^3$ Production

Resin (Liquid Urea-Formaldehyde)

Delivered Cost = $ .55/kg
Consumption (@ 9%) = 1.075 x 722 x .090
=69.85 kg/m^3

Where, 1.075 is factor for Trim loss,
722 kg/m is board density

Resin Cost = 69.85 x .55
= $38.42/$m^3$ Production

Wax

Delivered Cost = $.44/kg
Consumption (@1.5%) = 1.075 x 722 x .008
= 6.21 kg/m^3
Wax Cost = $2.73/$m^3$ Production

Labour

Total Labour Cost (from ROI Calc) = $2,894,000/yr

$$\text{Unit Labour Cost} = \frac{\$2,894,000}{106,000}$$

$$= \$27.30/m^3$$

Supplies

Est. $10/$m^3$ - belts
knives
mobile fuel
lubricants
Parts

Electricity

Energy Consumption	= 218 KWHr/m^3
Effective Energy & Demand Charge	= $0.043/KWHr
Direct Power Cost	= 218 x 0.043
	$9.37/$m^3$ production

Shipping Materials

Wrapping	$1.00/$m^3$
Spacer Blocks	$1.00/$m^3$
Strapping and corners	$1.00/$m^3$
Total	$3.00/$m^3$

Supervision

Total Annual Cost from DCFROI Calc. = $492,000

$$\text{Unit Cost} = \frac{492,000}{106,000} = \$4.64/m^3$$

Office Overhead

Total Annual Cost from DCFROI Calc. = $242,000

$$\text{Unit Cost} = \frac{242,000}{106,000} = \$2.28/m^3$$

Insurance and Taxes

Estimated Total = $250,000

$$\text{Unit Cost} = \frac{\$250,000}{106,000} = \$2.36$$

6.3 MDF Plant Operating Costs

6.3.1 Summary

Annual Production = 94,000 m^3/yr (53 MMSF/yr,3/4")
Operating Days = 350 Days/Yr
Net Expected Operating Hours = 6666 Hrs/Yr (19 hrs/day)

Costs	Annual	$/$m^3$ Prod'n
Wood	2,806,000	29.85
Resin	3,981,000	42.35
Wax	167,000	1.78
Labour	2,893,000	30.78
Supplies	940,000	10.00
Electricity	1,172,000	12.47
Shipping M	282,000	3.00
Supervision	492,000	5.23
Office Overhead	242,000	2.57
Insurance & Taxes	250,000	2.66
Total	$13,225,000	$140.69

6.3.2 Estimates

Wood

Delivered cost = $44/Cd
= $19.90/$m^3$ @ 2.21 m^3/Cd
Consumption = 1.5 m^3 Wood/m^3 Production
Wood Cost = $19.90 x 1.5 = $29.85/$m^3$ Production

Resin (Liquid Urea-Formaldehyde)

Delivered Cost = $ .55/kg
Consumption (@9.5%) = 1.075 x 754 x .095
=77.00 kg/m^3

Where, 1.075 is factor for Trim loss,
754 kg/m is board density

Resin Cost = 77.00 x .55
= $42.35/$m^3$ Production

Wax

Delivered Cost = $.44/kg
Consumption (@0.5%) = 1.075 x 754 x .005
= 4.05 kg/m^3
Wax Cost = $1.78/$m^3$ Production

Labour

Total Labour Cost (from ROI Calc) = $2,893,000/yr

$$\text{Unit Labour Cost} = \frac{\$2,893,000}{94,000}$$

$$= \$30.78/m^3$$

Supplies

Est. $10/m^3 - belts
knives
mobile fuel
lubricants
Parts

Electricity

Energy Consumption	= 290 KWHr/m^3
Effective Energy & Demand Charge	= $0.043/KWHr
Direct Power Cost	= 290 x 0.043
	$12.47/$m^3$ production

Shipping Materials

Wrapping	$1.00/$m^3$
Spacer Blocks	$1.00/$m^3$
Strapping and corners	$1.00/$m^3$
Total	$3.00/$m^3$

Supervision

Total Annual Cost from DCFROI Calc. = $492,000

$$\text{Unit Cost} = \frac{492,000}{94,000} = \$5.23/m^3$$

Office Overhead

Total Annual Cost from DCFROI Calc. = $242,000

$$\text{Unit Cost} = \frac{242,000}{94,000} = \$2.57/m^3$$

Insurance and Taxes

Estimated Total = $250,000

$$\text{Unit Cost} = \frac{\$250,000}{94,000} = \$2.66$$

7. Return on Investment and Cash Flow Analysis

7.1 General and Assumptions

The financial plan, return on investment (ROI) analysis, and total dollar requirement to get the plant operational resulted from the capital cost estimates, operating cost estimates and in addition, the following assumptions.

1. Capital cost estimates were based on 1987 Canadian dollars.

2. Interest rate for borrowed money at 10% per annum.

3. Depreciation rates for buildings and equipment are taken at their maximum rates below for income tax calculations:

Year	First	Second	Subsequent	Method
Buildings	2.5%	5%	5%	Declining Balance
Site Improvement	4%	8%	8%	Declining Balance
Production Equipment	25%	50%	25%	Straight Line
Office Equipment	10%	20%	20%	Declining Balance
Mobile Equipment	15%	30%	30%	Declining Balance

4. The depreciation base for income tax purposes has been reduced by the amounts of any Government Grants and the Investment Tax Credit.

5. Any Government Grants and the Investment Tax Credit have been amortized over 10 years after the plant begins operation.

6. DCFROI is calculated on an after tax basis on the net cash generated in each year in excess of a minimum cash balance of $10,000.

7. The full equity investment is put into the project in the first year.

.8 Current and deferred income taxes are calculated based on first using all losses carried forward from previous years operations, then taking advantage of the maximum capital cost allowances under the Income Tax Act followed by utilization of the Investment Tax Credits.

.9 Project financing to be on an approximate 2:1 debt to equity ratio, assuming any government grants as equity.

10. Government grants assumed to be 20% of the capital cost and payable at various milestones of the project. These milestones are:

    20% on completion of the buildings
    40% on installation of the equipment
    20% on start-up
    20% four months after start-up

11. A ten year term bank loan is used for debt financing.

12. A demand loan limited to a maximum of 50% of current assets is used to finance the first year of operation for bridge financing and working capital. This would be secured by receivables and inventory as collateral.

13. Working capital requirements assume Receivables at 30 days, Inventory for raw materials other than wood and for finished goods at 14 days, wood inventory at 90 days. Accounts payable are assumed at 30 days except for wood which is on a cash basis.

14. Labour costs of production are based on expected rates for the North West New Brunswick area and include a 7% overtime premium in their calculation.

15. Production rates used are conservative in the first two years of operation.

16. Inflation of production costs and escalation of sales prices over the 17 year plant operating period are not considered since it is assumed that these factors would increase proportionately. This will give a conservative estimate of the internal rate of return on investment unless costs rise more rapidly than sales price.

17. Income taxes payable are calculated at 20% on the first $200,000 of profit and 44.5% on anything over $200,000.

18. An investment tax credit of 10% has been assumed on the capital cost of the project less the value of the provincial grant received and less $200,000 for ineligible items. 40% of this tax credit is received as cash during the construction period and prior to the company generating profits.

19. No interest free government loans were included in the calculation.

20. The life of the project has been assumed at 15 full operating years. Zero salvage value has been assumed and all working capital is returned to cash in the seventeenth year.

21. Mill net sales prices used are $174/MSF (3/8") for OSB, $272/MSF (3/4") for particleboard and $444/MSF (3/4") for MDF. Reject boards are assumed at 2% of production. Sales are reduced accordingly although production costs remain the same.

7.2 OSB Plant Return on Investment Analysis Results

A financial model was prepared, based on the above assumptions for the 138 MMSF/Yr (3/8") OSB plant. It was determined that the plant could provide a Discounted Cash Flow Return on Investment (DCFROI) of 33.2% after taxes over the projected plant life for shareholders initial investments of $5,800,000. The mill net sales price used was $174/MSF (3/8"), which is a realistic current day price.

The analysis sheets are included in Appendix I.

7.3 PB Plant Return on Investment Analysis Results

A financial model was prepared, based on the assumptions in section 7.1 above, for the 60 MMSF/Yr (3/4") PB plant. It was determined that at the projected board sales price of $272/MSF (3/4") the plant would be non-profitable and, in fact, lose money, as shown by the negative earnings in Table V of the analysis. Substantially increased board sales prices would be necessary to allow this plant size to be viable.

It is conceivable however, that a much larger plant operation, with substantially reduced relative labour costs might be viable, if the raw wood material consisted primarily of shavings and sawdust waste which could be obtained for little or no cost.

This potential does not address the terms of reference for this study and as such, particleboard will not be considered further.

7.4 MDF Plant Return on Investment Analysis Results

A financial model was prepared, based on the assumptions in section 7.1 above, for the 53 MMSF/Yr (3/4") MDF plant. It was determined that the plant could provide a DCFROI after taxes of 37.6% over the projected plant life for shareholders initial investments of $6,000,000. The mill net sales price used was $444/MSF (3/4") ($251/m^3) which is an FOB mill average over the past four years, from the US Particleboard Association. US prices were converted to Canadian dollars at a rate of $1.00 CDN = $1.30 US.

The analysis sheets are included in Appendix II.

8. Preliminary Risk Analysis

A preliminary risk analysis was carried out using the financial model for the OSB plant and the MDF plant. PB was not further modeled since it would not be viable as it exists, let alone with problems.

The results of the risk analysis are shown in a tabular form which lists the expected DCFROI, after taxes, for various risk assumptions. The results are self-explanatory.

8.1 Projected Financing

Risk	OSB Plant DCFROI	MDF Plant DCFROI
Base	33.2	37.6
10% Grant	22.8	25.4
0% Grant	17.4	19.6
0% Grant 20% IF Loan	30.4	37.0
12% Interest Rate	27.4	33.7
1:1 Debt/Equity Ratio	22.9	25.7

8.2 Construction Cost Overruns

Risk	OSB Plant DCFROI	MDF Plant DCFROI
Base	33.2	37.6
10% Over	26.0	29.9
20% Over	22.8	26.5

8.3 Lack of Raw Material

Although it cannot be modeled, the availability of raw materials and in particular wood cannot be taken lightly.

The "Study of Utilization of Surplus Hardwood Resources for New Brunswick", prepared in 1985 by Neill and Gunter Limited indicated an apparent Hardwood AAC Provincial Net Surplus of 280,000 m^3 per year assuming the OSB plant in Chatham was operating at its maximum production rate. The Chatham plant was not operational at that time but have since started operation and are working their way upwards to their maximum production rate.

In order to supply the increased needs of its operation, the Chatham OSB plant has had to begin importing wood from regions 1, 3 and 5. A reason for this, besides the low apparent surplus in

region 2, is the fact that a high percentage of freehold woodlot owners (estimated by them as high as 50%) are reluctant to log their lands; especially when comparing hardwood sales prices to that of pulp mill wood sales prices. Thusly, the figure of 25% unavailability, stated in the Hardwood Resources Utilization Study may be rather optimistic, under the present economic conditions.

The net result of the above is that although the study indicated a large enough surplus of hardwood in Region 5, available at 275,000 m^3/yr, in actual fact, the amount may be somewhat less. It should be noted that the wood utilization by the OSB and MDF plants under consideration are 244,000 m^3/yr and 141,000 m^3/yr respectively.

The reduced availability of wood fiber would have the same effect on the plant DCFROI as noted below in section 8.5 under "Low Production Outputs".

8.4 Severe Price Competition

Risk	OSB Plant DCFROI	MDF Plant DCFROI
Base	33.2	37.6
10% Price Drop	14.5	21.3
15% Price Drop	5.5	13.7

8.5 Low Production Outputs

Risk	OSB Plant DCFROI	MDF Plant DCFROI
Base	33.2	37.6
10% Low Production	23.7	28.5
20% Low Production	14.5	19.2

8.6 Manufacturing Cost Overruns

Risk	OSB Plant DCFROI	MDF Plant DCFROI
Base	33.2	37.6
10% Higher Costs	19.2	26.3
20% Higher Costs	7.5	16.3

COMPOSITE PANEL FACILITY

PRELIMINARY FEASIBILITY STUDY - PHASE I

NORTH WESTERN NEW BRUNSWICK AREA

FOR

DEPARTMENT OF COMMERCE AND TECHNOLOGY

PROVINCE OF NEW BRUNSWICK

APPENDIX 1

NGM INTERNATIONAL

138MMSF/YR(3/8") OSB PLANT

DEPT.OF COMMERCE & TECHNOLOGY,NEW BRUNSWICK

TABLE I

JOB NO.: 3961
DATE: MAY 22/87
BY: JRB

CONSTRUCTION COST SUMMARY

860	SITE AND SITE DEVELOPMENT	$ 900000
870	BUILDINGS AND STRUCTURES	$ 6400000
880	MOBILE EQUIPMENT	$ 575000
890	WOOD HANDLING	$ 1945000
100	FLAKING AND WET STORAGE	$ 1820000
200	DRYING	$ 1600000
300	STORAGE AND BLENDING	$ 1372000
400	FORMING EQUIPMENT	$ 1204000
500	PRESSING EQUIPMENT	$ 4816000
600	TRIM,GRADE AND STRAPPING	$ 850000
700	HEAT ENERGY SYSTEM	$ 2000000
800	MAINTENANCE, OFFICE AND LAB EQUIPMENT	$ 185000
900	ELECTRICAL EQUIPMENT AND INSTALLATION	$ 2600000
1000	MECHANICAL EQUIPMENT INSTALLATION	$ 3875000
1100	MANUFACTURER'S REPRESENTITIVES	$ 200000
1200	SPARE PARTS	$ 500000
1300	ENGINEERING AND PROJECT MANAGEMENT	$ 2100000
1400	CONTINGENCY @ 0.15	$ 4821300
	SUB TOTAL	$36963300
1500	ESCALATION @ 0.05	$ 1687100
1600	INTEREST DURING CONSTRUCTION	$ 1646957
	TOTAL	$40217357
	USE	$40000000

10.00 % INTEREST DURING CONSTRUCTION CALCULATION

MONTH	% EXPEND.	EXPEND	EQ.&IFL	GRANT	LOAN	INTEREST
1	1	385784	385784		0	
2	1	385784	385784		0	0
3	5	1928520	1928520		0	0
4	4	1542816	1542816		0	0
5	4	1542816	1542816		0	0
6	4	1542816	14440		1528376	0
7	5	1928520	0		1928520	12736
8	5	1928520	0		1928520	28807
9	5	1928520	0		1928520	44878
10	6	2314224	0	1600000	714224	60949
11	6	2314224	0		2314224	66901
12	6	2314224	0		2314224	86187
SUBTOTAL	52	20056608				380460
13	6	2314224	0		2314224	105472
14	6	2314224	0		2314224	124757
15	6	2314224	0		2314224	144042
16	6	2314224	0		2314224	163327
17	7	2699928	0		2699928	182613
18	7	2699928	0	3200000	-500072	205112
19	6	2314224	0		2314224	200945
20	3	1157112	0	1600000	-442888	220230
SUBTOTAL	99				25984696	1646957
21						
22						
23	1					
24						
25				1600000		
INTEREST DURING CONSTRUCTION						$ 1646957

MAXIMUM CAPITAL COST ALLOWANCE

YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
BUILDINGS		160000	312000	296400	281580	267501	254126	241420	229349	217881	206987	196638	186806	177466	168592	160163	152155	
PROD.EQUIP.		7627600	15255200	7627600														
SITE IMPROVEMENTS		36000	69120	63590	58503	53823	49517	45556	41911	38558	35474	32636	30025	27623	25413	23380	21510	
OFFICE EQUIPMENT		18500	33300	26640	21312	17050	13640	10912	8729	6984	5587	4469	3576	2860	2288	1831	1465	
MOBILE EQUIPMENT		86250	146625	102638	71846	50292	35205	24643	17250	12075	8453	5917	4142	2899	2029	1421	994	
MAX. TOTAL DEPREC.		5708412	11387696	5844145	311934	279839	253791	232222	214813	198359	184698	172555	161675	151811	142793	134492	126809	25585225
BOOK DEPRECIATION ALLOWANCE																		
BUILDINGS AND SITE		175550	526649	526649	526649	526649	526649	526649	526649	526649	526649	526649	526649	526649	526649	526649	351099	
PLANT AND EQUIP.		1849268	3147883	3147883	3147883	3147883	3147883	3147883	3147883	3147883	3147883	2098536						
MOBILE EQUIP.		41483	124448	124448	124448	124448	82965											
TOTAL		1266300	3798900	3798900	3798900	3798900	3757417	3674452	3674452	3674452	3674452	2625184	526649	526649	526649	526649	351099	40000000
AMORT.GOVT. GRANT		373000	1119000	1119000	1119000	1119000	1119000	1119000	1119000	1119000	1119000	746000						

VGM INTERNATIONAL

138MMSF/YR(3.8M) OSB PLANT

DEPT. OF COMMERCE & TECHNOLOGY, NEW BRUNSWICK

JOB NO.: 3961
DATE: MAY 22/87
BY: JRB

TABLE I.0A

FINANCIAL PLAN

EQUITY FUNDS	$ 5000000
INTEREST FREE LOAN	$ 0
SUB TOTAL	$ 5000000
PROVINCIAL GRANT	$ 3000000
TERM BANK LOANS	$ 26700000
DEMAND LOAN	$ 1385047
TOTAL	$ 36085047

TABLE II

OPERATING AND MAINTENANCE LABOR COSTS

POSITION	SHIFT 1	SHIFT 2	SHIFT 3	SHIFT 4	RATE	COST/YEAR
PRODUCTION						
FOREMAN	1	1	1	1	17.50	147000
SCALES & SECURITY	1	1			11.00	46200
CAT 950	1	1			11.60	48720
CARR. LIFT	1	1	1	1	11.60	97440
DEBARKER	1	1	1	1	11.60	97440
LOG HANDLING	2	2	2	2	11.60	194880
SLASHER DECK	1	1	1	1	11.60	97440
WAFERIZER	1	1	1	1	11.60	97440
DRYER & HEAT ENERG	2	2	2	2	11.60	194880
PRESS	2	2	2	2	12.00	201600
TRIM & GRADE	1	1	1	1	11.60	97440
STRAP & FORK LIFT	1	1	1	1	11.60	97440
SHIPPING	1	1	1	1	11.60	97440
BLENDING	1	1	1	1	11.60	97440
KNIFE GRINDER	1	0			11.60	24360
CLEANUP	1	1	1	1	11.00	92400
MAINTENANCE						
DRAFTSMAN	2				11.00	0
CHIEF ELECTRICIAN	1				17.00	35700
CHIEF MECHANIC	1				17.00	35700
ELECTRONICS	1				16.00	33600
ELECTRICIAN	1	1	1	1	16.00	134400
APP.ELECTRICIAN		1	1	1	14.00	88200
WELDER	1	1			13.00	54600
MACHINIST	1	1			14.00	58800
MILLWRIGHT	1	1	1	1	13.00	109200
APP.MILLWRIGHT	1	1	1	1	11.50	96600
GRADER	0				11.00	0
CARPENTER	1				11.50	24152
MESSENGER	0				9.60	0
CHIEF FILER	0				12.10	0
KNIFE FILER		0			11.00	0
SAW FILER			0		11.00	0
AUTO MECHANIC	1				11.20	23512
SUBTOTAL	29	23	20	20		2424832
TOTAL OPERATING & MAINTENANCE STAFF	93		OVERTIME PREMIUM @		0.070	169838
			FRINGE BENEFITS @		0.230	557527
TOTAL LABOUR COSTS PER YEAR						$ 3151197

NGM INTERNATIONAL

138MMSF/YR(3/8") OSB PLANT

DEPT.OF COMMERCE & TECHNOLOGY,NEW BRUNSWICK

JOB NO.: 3961
DATE: MAY 22/87
BY: JRB

TABLE III

PROFORMA SCHEDULE OF MANUFACTURING COSTS

YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
PRODUCTION-MMSF-3/8"	0	50	110	125	138	138	138	138	138	138	138	138	138	138	138	138	138	
-m3x1000	0	44	97	111	122	122	122	122	122	122	122	122	122	122	122	122	122	
CONS. PRICE INDEX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
COST MULTIPLIER	1.00	1.00	1.00	1.00	1.00	1.00	1.20	1.00	1.00	1.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
COST OF SALES																		
DIRECT LABOR -$x1000		865	2594	2594	2594	2594	2594	2594	2594	2594	2594	2594	2594	2594	2594	2594	2594	
LABOR BENEFITS -$x1000		186	558	558	558	558	558	558	558	558	558	558	558	558	558	558	558	
TOTAL DIRECT LABOR -$x1000		1050	3151	3151	3151	3151	3151	3151	3151	3151	3151	3151	3151	3151	3151	3151	3151	
DIRECT MATERIALS -$x1000		3382	7103	7687	8487	8487	8487	8487	8487	8487	8487	8487	8487	8487	8487	8487	8487	
FACTORY OVERHEAD																		
POWER,LIGHT & HEAT -$x1000		383	637	698	761	761	761	761	761	761	761	761	761	761	761	761	761	
REPAIRS & MAINT. -$x1000		442	973	1161	1282	1282	1282	1282	1282	1282	1282	1282	1282	1282	1282	1282	1282	
PACKING MATERIALS -$x1000		88	195	232	256	256	256	256	256	256	256	256	256	256	256	256	256	
PREPRODUCTION EXP. -$x1000		340																
DEPR.PLANT & EQUIP -$x1000		1091	3272	3272	3272	3272	3231	3148	3148	3148	3148	2099	0	0	0	0	0	
AMORT.GOV'T GRANT -$x1000		-373	-1119	-1119	-1119	-1119	-1119	-1119	-1119	-1119	-1119	-746	0	0	0	0	0	
TOTAL MANUF. COST -$x1000		6325	14213	15875	16892	16892	16858	15967	15967	15967	15967	15291	13938	13938	13938	13938	13938	

NGM INTERNATIONAL

138MMSF/YR(3/8") OSB PLANT

DEPT.OF COMMERCE & TECHNOLOGY,NEW BRUNSWICK

JOB NO.: 3961
DATE: MAY 22/87
BY: JRB

TABLE IV

PROFORMA SELLING AND ADMINISTRATIVE EXPENSES

YEAR		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
PRODUCTION-MMSF-3/8"		0	50	110	125	138	138	138	138	138	138	138	138	138	138	138	138	138
-m3x1000		0	44	97	111	122	122	122	122	122	122	122	122	122	122	122	122	122
CONS. PRICE INDEX		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COST MULTIPLIER		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SALES PRICE INCREASE				0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.052
SALES PRICE	-$/MSF		196	211	211	211	211	211	211	211	211	211	211	211	211	211	211	211
DISCOUNTS & DUTY	-$/MSF	10	12	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
TRANSPORTATION	-$/MSF	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
MILL NET PRICE	-$/MSF		160	174	174	174	174	174	174	174	174	174	174	174	174	174	174	174
SALES	-$x1000	0	9588	22714	25811	28496	28496	28496	28496	28496	28496	28496	28496	28496	28496	28496	28496	28496
SELLING EXPENSE																		
DISCOUNTS & DUTY	-$x1000		593	1419	1612	1780	1780	1780	1780	1780	1780	1780	1780	1780	1780	1780	1780	1780
SALARIES	-$x1000		25	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
EMPLOYEE BENEFITS	-$x1000		5	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
ADVERTISING	-$x1000		20	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
TWA DUES	-$x1000		5	36	41	46	46	46	46	46	46	46	46	46	46	46	46	46
TRAVELLING	-$x1000		30	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
TRANSPORTATION	-$x1000		1191	2619	2976	3286	3286	3286	3286	3286	3286	3286	3286	3286	3286	3286	3286	3286
TOTAL	-$x1000		1868	4273	4829	5310	5310	5310	5310	5310	5310	5310	5310	5310	5310	5310	5310	5310
ADMINISTRATIVE EXPENSE																		
SALARIES	-$x1000		154	348	348	348	348	348	348	348	348	348	348	348	348	348	348	348
EMPLOYEE BENEFITS	-$x1000		31	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
TRAVELLING	-$x1000		12	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
INSURANCE & TAXES	-$x1000		100	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250
FIXED MAINTENANCE	-$x1000		24	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
TELEPHONE & TELEX	-$x1000		5	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
HEAT,LIGHT & A/C	-$x1000		2	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
SUPPLIES AND MISC.	-$x1000		7	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
LEGAL AND AUDIT	-$x1000		20	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
BAD DEBTS	-$x1000		48	114	129	142	142	142	142	142	142	142	142	142	142	142	142	142
BANK CHG.& SUNDRY	-$x1000		30	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
DEPR. OF BUILDINGS	-$x1000		176	527	527	527	527	527	527	527	527	527	527	527	527	527	527	351
TOTAL	-$x1000		609	1559	1575	1588	1588	1588	1588	1588	1588	1588	1588	1588	1588	1588	1588	1413
FINANCIAL EXPENSE CALCULATION																		
DEMAND LOAN-START	-$x1000	0	0	2385	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEMAND LOAN-END	-$x1000	0	2385	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TERM LOAN-START	-$x1000	0	12657	26700	26700	24030	21360	18690	16020	13350	10680	8010	5340	2670	0	0	0	0
TERM LOAN-END	-$x1000	12657	26700	26700	24030	21360	18690	16020	13350	10680	8010	5340	2670	0	0	0	0	0
TOTAL LOAN-START	-$x1000	0	12657	29085	26700	24030	21360	18690	16020	13350	10680	8010	5340	2670	0	0	0	0
TOTAL LOAN-END	-$x1000	12657	29085	26700	24030	21360	18690	16020	13350	10680	8010	5340	2670	0	0	0	0	0
INTEREST	-$x1000	633	676	2789	2537	2213	2003	1736	1469	1202	935	668	401	134	0	0	0	0

NGM INTERNATIONAL

136MMSF/YR(3/8") OSB PLANT

DEPT. OF COMMERCE & TECHNOLOGY, NEW BRUNSWICK

JOB NO.: 3961
DATE: MAY 22/87
BY: JRB

TABLE V

PROFORMA STATEMENT OF REVENUE AND EXPENSES

YEAR		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
PRODUCTION-MMSF-3/8"		0	50	110	125	136	136	136	136	136	136	136	136	136	136	136	136	136
-m3x1000		0	44	97	111	122	122	122	122	122	122	122	122	122	122	122	122	122
SALES	-$x1000	0	9588	22714	25811	28496	28496	28496	28496	28496	28496	28496	28496	28496	28496	28496	28496	28496
COST OF SALES	-$x1000	0	6315	14213	15875	16892	16850	15967	15967	15967	15967	15291	13938	13938	13938	13938	13938	13938
GROSS MARGIN	-$x1000	0	3263	8501	10736	11604	11646	12529	12529	12529	12529	13205	14558	14558	14558	14558	14558	14558
SELLING EXPENSE	-$x1000	0	1868	4273	4819	5310	5310	5310	5310	5310	5310	5312	5310	5310	5310	5310	5310	5310
ADMIN. EXPENSE	-$x1000	0	609	1559	1575	1588	1588	1588	1588	1588	1588	1588	1588	1588	1588	1588	1588	1413
FINANCIAL EXP.	-$x1000		896	2789	2537	2270	2303	1736	1469	1231	935	868	481	134	0	0	0	0
EARNINGS PRETAX	-$x1000	0	90	-121	1796	3236	3503	3812	4162	4429	4696	4963	5906	7526	7659	7659	7659	7835
INCOME TAXES																		
CURRENT	-$x1000	0	0	0	0	0	0	238	1874	1964	3089	3214	3339	3462	3526	3530	3534	3537
DEFERRED	-$x1000	0	18	0	750	1391	1518	1439	-71	-1342	-1849	-1355	-759	-162	-167	-171	-175	-180
EARNINGS	-$x1000	0	72	-121	1046	1845	1993	2165	2359	2507	2655	2803	3327	4226	4300	4300	4300	4397
NET EARNINGS	-$x1000	0	72	-121	1046	1845	1993	2165	2359	2507	2655	2803	3327	4226	4300	4300	4300	4397

VGM INTERNATIONAL

138MMSF/YR(3/8") OSB PLANT

DEPT.OF COMMERCE & TECHNOLOGY,NEW BRUNSWICK

JOB NO.: 3961
DATE: MAY 22/87
BY: JRB

TABLE VI

CHANGES IN FINANCIAL POSITION

YEAR		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
SOURCE OF FUNDS																		
EARNINGS	-$x1000	0	72	-121	1346	1845	1993	2165	2359	2587	2655	2803	3327	4226	4300	4300	4300	4397
DEPRECIATION	-$x1000	0	1266	3799	3799	3799	3799	3757	3674	3674	3674	3674	2625	527	527	527	527	351
AMORT.GOVT.AID	-$x1000	0	-373	-1119	-1119	-1119	-1119	-1119	-1119	-1119	-1119	-1119	-746	0	0	0	0	0
DEFERRED TAXES	-$x1000	0	18	0	750	1391	1510	1489	-71	-1042	-1049	-1055	-759	-162	-167	-171	-175	-180
FUNDS FROM OPER.	-$x1000	0	983	2559	4476	5916	6183	6212	4843	4020	4162	4304	4447	4590	4660	4656	4652	4648
INT. FREE LOAN	-$x1000	0																
INV. TAX CREDIT	-$x1000	734	542	0	0	0	0	951	963	0	0	0	0	0	0	0	0	0
PROV. GRANT	-$x1000	1600	6400															
LONG TERM LOAN	-$x1000	12657	14043	0														
ISSUE OF SHARES	-$/1000	5300																
TOTAL	-$x1000	20791	21968	2559	4476	5916	6183	7163	5806	4020	4162	4304	4447	4590	4660	4656	4652	4648
APPLICATION OF FUNDS																		
FIXED ASSETS	-$x1000	20057	19943															
TERM LOAN INSTAL.	-$x1000			2670	2670	2670	2670	2670	2670	2670	2670	2670	2670	0	0	0	0	0
I.F.LOAN PAYMENT	-$x1000					3	0	0	0	0								
TOTAL	-$x1000	20057	19943	2670	2670	2670	2670	2670	2670	2670	2670	2670	2670	0	0	0	0	0
INCREASE IN FUNDS		734	2025	-111	1806	3246	3513	4493	3136	1350	1492	1634	1777	4590	4660	4656	4652	4648
WORKING CAPITAL-START			734	2759	2648	4454	7700	11213	15707	18843	20193	21685	23319	25095	29685	34345	39001	43652
WORKING CAPITAL-END		734	2759	2648	4454	7700	11213	15707	18843	20193	21685	23319	25095	29685	34345	39001	43652	48301

NGM INTERNATIONAL

138MMSF/YR(3/8") OSB PLANT

DEPT.OF COMMERCE & TECHNOLOGY,NEW BRUNSWICK

JOB NO.: 3961
DATE: MAY 22/87
BY: JRB

TABLE 3.1

DIRECT MATERIALS AND SERVICES COSTS

ITEM	COST/UNIT	UNIT	USEAGE/m3	COST/m3
WOOD	19.90	m3	2.00	39.80
RESIN	1.46	kg	17.23	25.15
WAX	0.44	kg	10.34	4.55
ELECTRICITY	0.04	kWh	145.00	6.24
HEAT ENERGY	0.00			0.00
PACKAGING MATERIAL				2.00
SUPPLIES & MAINT.				10.00
TOTAL DIRECT MATERIALS AND SERVICE COSTS				87.73

FRINGE BENEFITS	%
VACATION	3.00
SICK LEAVE	1.50
GROUP INSURANCE	4.00
COMPANY PENSION	0.33
CPP	1.90
U.I.C.	3.40
	0.00
WORKMEN'S COMP.	8.00
TOTAL	22.60
USE	23

TABLE VII

ADMINISTRATION AND OVERHEAD COSTS

PLANT MANAGER	1	50000
SALES MANAGER	0	46000
PRODUCTION MANAGER	1	41000
MAINTENANCE SUPERINTENDENT	1	39000
QUALITY CONTROL SUPERINTENDENT	1	35000
QUALITY CONTROL TECH.	4	80000
PURCHASING	1	30000
PLANT ENGINEER	0	0
SHIPPING FOREMAN	1	31000
SECRETARY-CLERKS	3	42000
SALES AND ORDER CLERK	1	16000
SUB TOTAL	14	410000
FRINGE BENEFITS @ 20 %		82000
SUB TOTAL	$	492000
OFFICE EXPENSE		
TELEPHONE AND TELEX		13000
HEAT, LIGHT AND A/C		5000
TRAVEL AND LIVING - GENERAL		30000
SALES, TRAVEL AND LIVING		75000
ADVERTISING AND PROMOTION (ALLOW)		50000
SUPPLIES AND MISCELLANEOUS		18000
LEGAL AND AUDIT	$	50000
SUB TOTAL	$	241500
TOTAL ADMIN. & OFFICE EXP.	$	733500
INSURANCE AND TAXES	$	250000

SUMMARY OF FIXED CASH ANNUAL OVERHEADS

ADMINISTRATION AND OFFICE EXPENSE	$	733500
FIXED MAINTENANCE EXPENSE	$	60000
INSURANCE AND TAXES	$	250000
SECURITY AND CONTINGENCIES	$	71000
TOTAL ADMIN. AND OVERHEAD	$	1114500

VGM INTERNATIONAL

138MMSF/YR(3/8") OSB PLANT

DEPT.OF COMMERCE & TECHNOLOGY, NEW BRUNSWICK

JOB NO.: 3961
DATE: MAY 22/87
BY: JRB

TABLE VIII

CURRENT AND DEFERRED TAX CALCULATION

YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
EARNINGS PRETAX -$x1000	0	90	-121	1796	3236	3503	3812	4162	4429	4696	4963	5986	7526	7659	7659	7659	7835
TAX PAYABLE		18	0	750	1391	1510	1647	1803	1922	2041	2159	2579	3308	3359	3359	3359	3437
DEPRECIATION ALLOWANCE	0	1266	3799	3799	3799	3799	3757	3674	3674	3674	3674	2625	527	527	527	527	351
AMORT. GOV'T GRANT	0	-373	-1119	-1119	-1119	-1119	-1119	-1119	-1119	-1119	-1119	-746	0	0	0	0	0
MAX. CAPITAL COST ALLOWANCE	0	5708	11388	5844	312	280	254	232	214	198	185	173	162	152	143	134	127
CORR. TAXABLE INCOME		-4725	-8829	-1368	5604	5903	6196	6485	6770	7053	7333	7613	7890	8034	8043	8051	8059
LOSS CARRY FWD	0	-4725	-13554	-14922	-9318	-3415	0	0	0	0	0	0	0	0	0	0	0
CURRENT TAXABLE INCOME		-4725	-13554	-14922	-9318	-3415	2781	6485	6770	7053	7333	7613	7890	8034	8043	8051	8059
CORRECTED TAX PAYABLE		0	0	0	0	0	1189	2837	2964	3089	3214	3339	3462	3526	3530	3534	3537
INVEST.TAX CREDIT AVBL.	1836	2456	1914	1914	1914	1914	1914	963	0	0	0	0	0	0	0	0	0
INVEST.TAX CREDIT USED	734	542	0	0	0	0	951	963	0	0	0	0	0	0	0	0	0
CURRENT TAX PAYABLE	0	0	0	0	0	0	238	1874	2964	3089	3214	3339	3462	3526	3530	3534	3537
DEFERRED TAXES	0	18	0	752	1391	1510	1409	-71	-1042	-1049	-1055	-759	-162	-167	-171	-175	-180

NGM INTERNATIONAL

138MMSF/YR(3/8") OSB PLANT

DEPT.OF COMMERCE & TECHNOLOGY,NEW BRUNSWICK

JOB NO.: 3961
DATE: MAY 22/87
BY: JRB

TABLE IX

BALANCE SHEET

YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
CURRENT ASSETS																	
CASH	2314	10	2156	3715	6988	10503	15000	18136	19486	20978	22640	24473	26393	31852	35700	40360	47964
ACCTS. RECV.& INV.	0	3105	3399	3665	3665	3664	3660	3660	3660	3660	3632	3576	3576	3576	3576	3576	620
INV. TAX CREDIT RECVBL.	734	542	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GRANT RECEIVABLE	0	1600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL CURNT. ASSET	3048	5257	5555	7380	12653	14166	18662	21796	23146	24638	26272	28048	29968	34628	39283	43935	48584
INV. TAX CREDIT DEFF.	2456	1914	1914	1914	1914	1914	963	0	0	0	0	0	0	0	0	0	0
DEFF. GRANT RECEIV.	6400																
FIXED ASSETS																	
PLANT AND EQUIP.	28057	40000	40000	40000	40000	40000	40000	40000	40000	40000	40000	40000	40000	40000	40000	40000	40000
DEPRECIATION	0	1266	5065	8864	12663	16462	20219	23894	27568	31243	34917	37542	38869	38596	39122	39649	40000
TOTAL FIXED ASSETS	28057	38734	34935	31136	27337	23538	19781	16106	12432	8757	5083	2458	1931	1404	878	351	0
TOTAL ASSETS	31961	45905	42404	40430	39904	39618	39403	37902	35578	33395	31355	30506	31899	36032	40161	44286	48584
CURRENT LIABILITIES																	
ACCTS. PAYABLE	2314	113	137	256	283	283	283	283	283	283	283	283	283	283	283	283	283
TERM & INF LOAN PAYMENT			2670	2670	2670	2670	2670	2670	2670	2670	2670	2670	0	0	0	0	0
DEMAND LOAN PAYABLE	0	2385	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL CURRENT LIAB	2314	2498	2807	2926	2953	2953	2953	2953	2953	2953	2953	2953	283	283	283	283	283
FIXED LIABILITIES																	
TERM BANK LOAN	12657	26700	24030	21360	18690	16020	13350	10680	8010	5340	2670	0	0	0	0	0	0
INT. FREE LOAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEFERRED GOVT. ASST.	11190	11190	11190	11190	11190	11190	11190	11190	11190	11190	11190	11190	11190	11190	11190	11190	11190
AMORT.GOVT.GRANT		373	1492	2611	3730	4849	5966	7087	8206	9325	10444	11190	11190	11190	11190	11190	11190
NET GOVT. ASST.	11190	10817	9698	8579	7460	6341	5222	4103	2984	1865	746	0	0	0	0	0	0
DEFERRED TAXES	0	18	18	768	2159	3669	5279	5008	3966	2917	1862	1102	940	773	602	428	328
CAPITAL STOCK	5800	5800	5800	5800	5802	5800	5800	5800	5800	5800	5800	5800	5800	5800	5800	5800	5800
RETAINED EARNINGS	0	72	-49	997	2842	4835	7000	9358	11865	14521	17324	20651	24876	29176	33476	37776	42173
TOTAL LIABILITIES	31961	45905	42404	40430	39904	39618	39403	37902	35578	33395	31355	30506	31899	36032	40161	44286	48584
WORKING CAPITAL	734	2759	2648	4454	7700	11213	15707	18843	20193	21685	23319	25095	29685	34345	39001	43652	48301
EQUITY CASH FLOW	-5800	0	2146	1559	3273	3515	4497	3136	1358	1492	1662	1833	1928	4660	4656	4652	7321
DCF@0%	0.332																
	0																

COMPOSITE PANEL FACILITY

PRELIMINARY FEASIBILITY STUDY - PHASE I

NORTH WESTERN NEW BRUNSWICK AREA

FOR

DEPARTMENT OF COMMERCE AND TECHNOLOGY

PROVINCE OF NEW BRUNSWICK

APPENDIX 2

NGM INTERNATIONAL

60MMSF/YR(3/4") PB PLANT

DEPT.OF COMMERCE & TECHNOLOGY,NEW BRUNSWICK

TABLE I

JOB NO.: 3961
DATE: MAY 22/87
BY: JRB

CONSTRUCTION COST SUMMARY

860	SITE AND SITE DEVELOPMENT	$ 900000
870	BUILDINGS AND STRUCTURES	$ 6400000
880	MOBILE EQUIPMENT	$ 575000
890	WOOD HANDLING	$ 1245000
100	FLAKING AND WET STORAGE	$ 1842000
200	SHAVINGS & SANDUST	$ 276000
300	FIBER PREPARATION	$ 1507000
400	FORMING EQUIPMENT	$ 2000000
500	PRESSING EQUIPMENT	$ 4463000
600	TRIM,GRADE AND STRAPPING	$ 2185000
700	HEAT ENERGY SYSTEM	$ 2000000
800	PNEUMATIC SYSTEMS	$ 736000
900	ELECTRICAL EQUIPMENT	$ 1116000
1000	INSTALLATION	$ 4262000
1100	MANUFACTURER'S REPRESENTITIVES	$ 200000
1200	SPARE PARTS	$ 500000
1300	ENGINEERING AND PROJECT MANAGEMENT	$ 2100000
1400	CONTINGENCY @ 0.15	$ 4846050
	SUB TOTAL	$37153050
1500	ESCALATION @ 0.05	$ 1615350
1600	INTEREST DURING CONSTRUCTION	$ 1496510
	TOTAL	$40264910
	USE	$40000000

10.00 %

INTEREST DURING CONSTRUCTION CALCULATION

MONTH	% EXPEND.	EXPEND	EQ.&IFL	GRANT	LOAN	INTEREST
1	1	387684	387684		0	
2	1	387684	387684		0	0
3	5	1938420	1938420		0	0
4	4	1550736	1550736		0	0
5	4	1550736	1550736		0	0
6	4	1550736	1384740		165996	0
7	5	1938420	0		1938420	1383
8	5	1938420	0		1938420	17537
9	5	1938420	0		1938420	33690
10	6	2326104	0	1600000	726104	49844
11	6	2326104	0		2326104	55895
12	6	2326104	0		2326104	75279
SUBTOTAL	52	20159568				233628
13	6	2326104	0		2326104	94663
14	6	2326104	0		2326104	114847
15	6	2326104	0		2326104	133431
16	6	2326104	0		2326104	152816
17	7	2713788	0		2713788	172200
18	7	2713788	0	3200000	-486212	194815
19	6	2326104	0		2326104	198763
20	3	1163052	0	1600000	-436948	210147
SUBTOTAL	99				24780716	1496510
21						
22						
23	1					
24						
25				1600000		

INTEREST DURING CONSTRUCTION $ 1496510

MAXIMUM CAPITAL COST ALLOWANCE

YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
BUILDINGS		160000	312000	296400	281580	267501	254126	241420	229349	217881	206987	196638	186806	177466	168592	160163	152155	
PROD.EQUIP.		7539350	15078700	7539350														
SITE IMPROVEMENTS		36000	69120	63590	58503	53823	49517	45556	41911	38558	35474	32636	30025	27623	25413	23380	21510	
OFFICE EQUIPMENT		73600	132480	105984	84787	67830	54264	43411	34729	27783	22226	17781	14225	11380	9104	7283	5827	
MOBILE EQUIPMENT		86250	146625	102638	71846	50292	35205	24643	17250	12075	8453	5917	4142	2899	2029	1421	994	
MAX. TOTAL DEPREC.		5684544	11332026	5837733	357636	316401	283048	255621	232732	213334	196661	182140	169342	157945	147788	138418	129949	
BOOK DEPRECIATION ALLOWANCE																		25635222
BUILDINGS AND SITE		174653	523959	523959	523959	523959	523959	523959	523959	523959	523959	523959	523959	523959	523959	523959	349306	
PLANT AND EQUIP.		1858719	3152156	3152156	3152156	3152156	3152156	3152156	3152156	3152156	3152156	2181437						
MOBILE EQUIP.		41271	123812	123812	123812	123812	82541											
TOTAL		1266642	3799927	3799927	3799927	3799927	3758656	3676115	3676115	3676115	3676115	2625396	523959	523959	523959	523959	349306	
AMORT.GOVT. GRANT		373000	1119000	1119000	1119000	1119000	1119000	1119000	1119000	1119000	1119000	746000						40000000

NGH INTERNATIONAL

60MMSF/YR(3.4") PB PLANT

DEPT. OF COMMERCE & TECHNOLOGY, NEW BRUNSWICK

JOB NO.: 3961
DATE: MAY 22/87
BY: JRB

TABLE 1.0A

FINANCIAL PLAN

EQUITY FUNDS	$ 7200000
INTEREST FREE LOAN	$ 0
SUB TOTAL	$ 7200000
PROVINCIAL GRANT	$ 8000000
TERM BANK LOANS	$ 26700000
DEMAND LOAN	$ 2258569
TOTAL	$ 44158569

TABLE II

OPERATING AND MAINTENANCE LABOR COSTS

POSITION	SHIFT 1	SHIFT 2	SHIFT 3	SHIFT 4	RATE	COST/YEAR
PRODUCTION						
FOREMAN	1	1	1	1	17.50	147000
SCALES & SECURITY	1	1			11.00	46200
CAT 950	1	1			11.60	48720
CARRY LIFT	1	1	1	1	11.60	97440
DEBARKER	1	1	1	1	11.60	97440
REFINER	1	1	1	1	11.60	97440
WOOD HANDLING	1	1	1	1	11.60	97440
SLASHER DECK	1	1	1	1	11.60	97440
WAFERIZER	1	1	1	1	11.60	97440
DRYER & HEAT ENERG	1	1	1	1	11.60	97440
PRESS	1	1	1	1	12.00	100800
TRIM & GRADE	1	1	1	1	11.60	97440
STRAP & FORK LIFT	1	1	1	1	11.60	97440
SHIPPING	1	1	1	1	11.60	97440
BLENDING	1	1	1	1	11.60	97440
KNIFE GRINDER	1	0			11.60	24360
CLEANUP	1	1	1	1	11.00	92400
MAINTENANCE						
DRAFTSMAN	0				11.00	0
CHIEF ELECTRICIAN	1				17.00	35700
CHIEF MECHANIC	1				17.00	35700
ELECTRONICS	1				16.00	33600
ELECTRICIAN	1	1	1	1	16.00	134400
APP.ELECTRICIAN		1	1	1	14.00	88200
WELDER	1	1			13.00	54600
MACHINIST	1	1			14.00	58800
MILLWRIGHT	1	1	1	1	13.00	109200
APP.MILLWRIGHT	1	1	1	1	11.50	96600
GRADER	0				11.00	0
CARPENTER	1				11.50	24150
MESSENGER	0				9.60	0
CHIEF FILER	0				12.10	0
KNIFE FILER		0			11.00	0
SAW FILER			0		11.00	0
AUTO MECHANIC	1				11.20	23520
SUBTOTAL	27	22	18	18		2225790
TOTAL OPERATING & MAINTENANCE STAFF	85	OVERTIME PREMIUM @			0.070	155805
		FRINGE BENEFITS @			0.230	511932
TOTAL LABOUR COSTS PER YEAR						$ 2893527

NGM INTERNATIONAL

60MMSF/YR(3/4") PB PLANT

DEPT.OF COMMERCE & TECHNOLOGY,NEW BRUNSWICK

JOB NO.: 3961
DATE: MAY 22/87
BY: JRB

TABLE III

PROFORMA SCHEDULE OF MANUFACTURING COSTS

YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
PRODUCTION-MMSF-3/8"	0	30	90	108	120	120	120	120	120	120	120	120	120	120	120	120	120	
-m3x1000	0	27	80	96	106	106	106	106	106	106	106	106	106	106	106	106	106	
CONS. PRICE INDEX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
COST MULTIPLIER	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
COST OF SALES																		
DIRECT LABOR -$x1000		794	2382	2382	2382	2382	2382	2382	2382	2382	2382	2382	2382	2382	2382	2382	2382	
LABOR BENEFITS -$x1000		171	512	512	512	512	512	512	512	512	512	512	512	512	512	512	512	
TOTAL DIRECT LABOR -$x1000		965	2894	2894	2894	2894	2894	2894	2894	2894	2894	2894	2894	2894	2894	2894	2894	
DIRECT MATERIALS -$x1000		2073	5937	6785	7539	7539	7539	7539	7539	7539	7539	7539	7539	7539	7539	7539	7539	
FACTORY OVERHEAD																		
POWER,LIGHT & HEAT -$x1000		274	784	896	995	995	995	995	995	995	995	995	995	995	995	995	995	
REPAIRS & MAINT. -$x1000		265	796	1003	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115	1115	
PACKING MATERIALS -$x1000		88	239	301	334	334	334	334	334	334	334	334	334	334	334	334	334	
PREPRODUCTION EXP. -$x1000		348																
DEPR.PLANT & EQUIP -$x1000		1892	3276	3276	3276	3276	3235	3152	3152	3152	3152	2181	0	0	0	0	0	
AMORT.GOV'T GRANT -$x1000		-373	-1119	-1119	-1119	-1119	-1119	-1119	-1119	-1119	-1119	-746	0	0	0	0	0	
TOTAL MANUF. COST -$x1000		4716	12807	14036	15835	15835	14993	14911	14911	14911	14911	14233	12878	12878	12878	12878	12878	

NGM INTERNATIONAL

60MMSF/YR(3/4") PB PLANT

DEPT.OF COMMERCE & TECHNOLOGY,NEW BRUNSWICK

JOB NO.: 3961
DATE: MAY 22/87
BY: JRB

TABLE IV

PROFORMA SELLING AND ADMINISTRATIVE EXPENSES

YEAR		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
PRODUCTION-MMSF-3/8"		0	30	90	108	120	120	120	120	120	120	120	120	120	120	120	120	120
-m3x1000		0	27	80	96	106	106	106	106	106	106	106	106	106	106	106	106	106
CONS. PRICE INDEX		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COST MULTIPLIER		1.00	1.00	1.00	1.02	1.00	1.00	1.00	1.00	1.02	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SALES PRICE INCREASE				0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.052
SALES PRICE	-$/MSF		170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170
DISCOUNTS & DUTY	-$/MSF	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
TRANSPORTATION	-$/MSF	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
MILL NET PRICE	-$/MSF		136	136	136	136	136	136	136	136	136	136	136	136	136	136	136	136
SALES	-$x1000	0	4995	14984	17981	19979	19979	19979	19979	19979	19979	19979	19979	19979	19979	19979	19979	19979
SELLING EXPENSE																		
DISCOUNTS & DUTY	-$x1000		302	907	1089	1210	1210	1210	1210	1210	1210	1210	1210	1210	1210	1210	1210	1210
SALARIES	-$x1000		25	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
EMPLOYEE BENEFITS	-$x1000		5	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
ADVERTISING	-$x1000		20	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
TWA DUES	-$x1000		5	30	36	40	40	40	40	40	40	40	40	40	40	40	40	40
TRAVELLING	-$x1000		30	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
TRANSPORTATION	-$x1000		714	2143	2571	2857	2857	2857	2857	2857	2857	2857	2857	2857	2857	2857	2857	2857
TOTAL	-$x1000		1101	3279	3895	4306	4306	4306	4306	4306	4306	4306	4306	4306	4306	4306	4306	4306
ADMINISTRATIVE EXPENSE																		
SALARIES	-$x1000		154	348	348	348	348	348	348	348	348	348	348	348	348	348	348	348
EMPLOYEE BENEFITS	-$x1000		31	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
TRAVELLING	-$x1000		12	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
INSURANCE & TAXES	-$x1000		100	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250
FIXED MAINTENANCE	-$x1000		24	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
TELEPHONE & TELEX	-$x1000		5	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
HEAT,LIGHT & A/C	-$x1000		2	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
SUPPLIES AND MISC.	-$x1000		7	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
LEGAL AND AUDIT	-$x1000		20	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
BAD DEBTS	-$x1000		25	75	90	100	100	100	100	100	100	100	100	100	100	100	100	100
BANK CHG.& SUNDRY	-$x1000		30	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
DEPR. OF BUILDINGS	-$x1000		175	524	524	524	524	524	524	524	524	524	524	524	524	524	524	349
TOTAL	-$x1000		585	1518	1533	1543	1543	1543	1543	1543	1543	1543	1543	1543	1543	1543	1543	1368
FINANCIAL EXPENSE CALCULATION																		
DEMAND LOAN-START	-$x1000	0	0	2251	3163	7900	12824	16315	20762	25384	30192	35204	40408	45820	51550	54898	58562	62571
DEMAND LOAN-END	-$x1000	0	2251	3163	7900	12824	16315	20762	25384	30192	35204	40408	45820	51550	54898	58562	62571	62629
TERM LOAN-START	-$x1000	0	11360	26700	26700	24030	21360	18690	16020	13350	10680	8010	5340	2670	0	0	0	0
TERM LOAN-END	-$x1000	11360	26700	26700	24030	21360	18690	16020	13350	10680	8010	5340	2670	0	0	0	0	0
TOTAL LOAN-START	-$x1000	0	11360	28951	29863	31930	33384	35005	36782	38734	40872	43214	45748	48490	51550	54898	58562	62571
TOTAL LOAN-END	-$x1000	11360	28951	29863	31932	33384	35005	3678.	38734	40872	43214	45748	48490	51550	54898	58562	62571	62629
INTEREST	-$x.200	568	672	2941	3092	3266	3419	3589	3776	3988	4204	4448	4712	5002	5322	5673	6057	6260

NGM INTERNATIONAL

[redacted]MSF/YR(3/4") PB PLANT

DEPT. OF COMMERCE & TECHNOLOGY, NEW BRUNSWICK

JOB NO.: 3961
DATE: MAY 22/87
BY: JRB

TABLE V

PROFORMA STATEMENT OF REVENUE AND EXPENSES

YEAR		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
PRODUCTION-MMSF-3/8"		0	30	90	120	120	120	120	120	120	120	120	120	120	120	120	120	120
-0.3x1000		0	27	80	96	106	106	106	106	106	106	106	106	106	106	106	106	106
SALES	-$x1000	0	4995	14984	17981	19979	19979	19979	19979	19979	19979	19979	19979	19979	19979	19979	19979	19979
COST OF SALES	-$x1000	0	4716	12907	14036	15035	15035	14993	14911	14911	14911	14911	14233	12878	12878	12878	12878	12878
GROSS MARGIN	-$x1000	0	279	2177	3945	4944	4944	4986	5068	5068	5068	5068	5746	7101	7101	7101	7101	7101
SELLING EXPENSE	-$x1000	0	1101	3279	3895	4386	4386	4386	4386	4386	4386	4386	4386	4386	4386	4386	4386	4386
ADMIN. EXPENSE	-$x1000	0	585	1518	1533	1543	1543	1543	1543	1543	1543	1543	1543	1543	1543	1543	1543	1368
FINANCIAL EXP.	-$x1000		672	2941	3890	3166	3419	3589	3776	3982	4204	4448	4712	5002	5322	5673	6057	6268
EARNINGS PRETAX	-$x1000	0	-2279	-5561	-4573	-4170	-4324	-4452	-4556	-4761	-4985	-5229	-4815	-3749	-4070	-4420	-4804	-4833
INCOME TAXES																		
CURRENT	-$x1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEFERRED	-$x1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EARNINGS	-$x1000	0	-2279	-5561	-4573	-4170	-4324	-4452	-4556	-4761	-4985	-5229	-4815	-3749	-4070	-4420	-4804	-4833
NET EARNINGS	-$x1000	0	-2279	-5561	-4573	-4170	-4324	-4452	-4556	-4761	-4985	-5229	-4815	-3749	-4070	-4420	-4804	-4833

NGM INTERNATIONAL

6[illegible]SF/YR(3/4") PB PLANT

DEPT.OF COMMERCE & TECHNOLOGY,NEW BRUNSWICK

JOB NO.: 3961
DATE: MAY 22/87
BY: JRB

TABLE VI

CHANGES IN FINANCIAL POSITION

YEAR			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
SOURCE OF FUNDS																			
EARNINGS	-6x1000	0	-2279	-5561	-4573	-4178	-4314	-4452	-4556	-4781	-4985	-5229	-4815	-3749	-4878	-4428	-4884	-4833
DEPRECIATION	-6x1000	0	1267	3800	3800	3800	3800	3759	3676	3676	3676	3676	2625	524	524	524	524	349
AMORT.GOVT.AID	-6x1000	0	-373	-1119	-1119	-1119	-1119	-1119	-1119	-1119	-1119	-1119	-746	0	0	0	0	0
DEFERRED TAXES	-6x1000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FUNDS FROM OPER.	-6x1000	0	-1186	-2880	-1892	-1489	-1643	-1813	-1999	-2224	-2428	-2672	-2935	-3225	-3546	-3896	-4288	-4483
INT. FREE LOAN	-6x1000	0																
INV. TAX CREDIT	-6x1000	738	538	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1914
PROV. GRANT	-6x1000	1600	6400															
LONG TERM LOAN	-6x1000	11360	15340	0														
ISSUE OF SHARES	-6x1000	7200																
TOTAL	-6x1000	20898	21092	-2880	-1892	-1489	-1643	-1813	-1999	-2224	-2428	-2672	-2935	-3225	-3546	-3896	-4288	-2569
APPLICATION OF FUNDS																			
FIXED ASSETS	-6x1000	20160	19840															
TERM LOAN INSTAL.	-6x1000			2670	2670	2670	2670	2670	2670	2670	2670	2670	2670	0	0	0	0	0
I.F.LOAN PAYMENT	-6x1000					0	0	0	0	0								
TOTAL	-6x1000	20160	19840	2670	2670	2670	2670	2670	2670	2670	2670	2670	2670	0	0	0	0	0
INCREASE IN FUNDS		738	1252	-5550	-4562	-4159	-4313	-4483	-4669	-4874	-5098	-5342	-5605	-3225	-3546	-3896	-4288	-2569
WORKING CAPITAL-START			738	1990	-3559	-8121	-12280	-16593	-21076	-25745	-30619	-35717	-41059	-46664	-49889	-53435	-57332	-61612
WORKING CAPITAL-END		738	1990	-3559	-8121	-12280	-16593	-21076	-25745	-30619	-35717	-41059	-46664	-49889	-53435	-57332	-61612	-64181

NGM INTERNATIONAL

60MMSF/YR(3/4") PB PLANT

DEPT.OF COMMERCE & TECHNOLOGY,NEW BRUNSWICK

JOB NO.: 3961
DATE: MAY 22/87
BY: JRB

TABLE 3.1

DIRECT MATERIALS AND SERVICES COSTS

ITEM	COST/UNIT	UNIT	USEAGE/m3	COST/m3
WOOD	19.90	m3	1.50	29.85
RESIN	0.55	kg	69.85	38.42
WAX	0.44	kg	6.21	2.73
ELECTRICITY	0.04	kwh	218.00	9.37
HEAT ENERGY	0.00			0.00
PACKAGING MATERIAL				3.00
SUPPLIES & MAINT.				10.00
TOTAL DIRECT MATERIALS AND SERVICE COSTS				93.37

FRINGE BENEFITS	%
VACATION	3.00
SICK LEAVE	1.50
GROUP INSURANCE	4.00
COMPANY PENSION	0.00
CPP	1.90
U.I.C.	3.40
	0.00
WORKMEN'S COMP.	8.00
TOTAL	22.60
USE	23

TABLE VII

ADMINISTRATION AND OVERHEAD COSTS

PLANT MANAGER	1	50000
SALES MANAGER	1	46000
PRODUCTION MANAGER	1	41000
MAINTENANCE SUPERINTENDENT	1	39000
QUALITY CONTROL SUPERINTENDENT	1	35000
QUALITY CONTROL TECH.	4	88000
PURCHASING	1	30000
PLANT ENGINEER	0	0
SHIPPING FOREMAN	1	31000
SECRETARY-CLERKS	3	42000
SALES AND ORDER CLERK	1	16000
SUB TOTAL	15	418000
FRINGE BENEFITS @ 20 %		83000
SUB TOTAL		$ 492000
OFFICE EXPENSE		
TELEPHONE AND TELEX		13000
HEAT, LIGHT AND A/C		5500
TRAVEL AND LIVING - GENERAL		30000
SALES, TRAVEL AND LIVING		75000
ADVERTISING AND PROMOTION (ALLOW)		50000
SUPPLIES AND MISCELLANEOUS		18000
LEGAL AND AUDIT		50000
SUB TOTAL		$ 241500
TOTAL ADMIN. & OFFICE EXP.		$ 733500
INSURANCE AND TAXES		$ 250000

SUMMARY OF FIXED CASH ANNUAL OVERHEADS	
ADMINISTRATION AND OFFICE EXPENSE	$ 733500
FIXED MAINTENANCE EXPENSE	$ 60000
INSURANCE AND TAXES	$ 250000
SECURITY AND CONTINGENCIES	$ 71000
TOTAL ADMIN. AND OVERHEAD	$ 1114500

NGK INTERNATIONAL

60MMSF/YR(3/4") PB PLANT

DEPT.OF COMMERCE & TECHNOLOGY,NEW BRUNSWICK

JOB NO.: 3961
DATE: MAY 22/87
BY: JRB

TABLE VIII

CURRENT AND DEFERRED TAX CALCULATION

YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
EARNINGS PRETAX -6x1000	0	-2079	-5561	-4573	-4170	-4324	-4452	-4556	-4761	-4985	-5229	-4815	-3749	-4070	-4420	-4804	-4833
TAX PAYABLE		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEPRECIATION ALLOWANCE	0	1267	3800	3800	3800	3800	3759	3676	3676	3676	3676	2625	524	524	524	524	349
AMORT. GOV'T GRANT	0	-373	-1119	-1119	-1119	-1119	-1119	-1119	-1119	-1119	-1119	-746	0	0	0	0	0
MAX. CAPITAL COST ALLOWANCE	0	5685	11331	5838	358	316	283	256	233	213	197	182	169	158	148	138	130
CORR. TAXABLE INCOME		-6878	-14211	-7730	-1847	-1959	-2096	-2255	-2437	-2641	-2868	-3118	-3395	-3704	-4044	-4419	-4613
LOSS CARRY FWD	0	-6878	-21088	-28811	-30658	-32618	-34713	-36968	-39405	-42046	-44914	-48032	-51427	-55130	-59175	-63593	-68207
CURRENT TAXABLE INCOME		-6878	-21088	-28811	-30658	-32618	-34713	-36968	-39405	-42046	-44914	-48032	-51427	-55130	-59175	-63593	-68207
CORRECTED TAX PAYABLE		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INVEST.TAX CREDIT AVBL.	1846	2452	1914	1914	1914	1914	1914	1914	1914	1914	1914	1914	1914	1914	1914	1914	1914
INVEST.TAX CREDIT USED	738	538	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CURRENT TAX PAYABLE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEFERRED TAXES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

NGM INTERNATIONAL

60MMSF/YR(3/4") PB PLANT

DEPT.OF COMMERCE & TECHNOLOGY,NEW BRUNSWICK

JOB NO.: 3961
DATE: MAY 22/87
BY: JRB

TABLE IX

BALANCE SHEET

YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
CURRENT ASSETS																	
CASH	2326	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
ACCTS. RECV.& INV.	0	2162	2463	2671	2671	2670	2666	2666	2666	2666	2638	2582	2582	2582	2582	2582	388
INV. TAX CREDIT RECVBL.	738	538	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GRANT RECEIVABLE	0	1608	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL CURNT. ASSET	3064	4318	2473	2681	2681	2680	2676	2676	2676	2676	2648	2592	2592	2592	2592	2592	398
INV. TAX CREDIT DEFF.	2452	1914	1914	1914	1914	1914	1914	1914	1914	1914	1914	1914	1914	1914	1914	1914	0
DEFF. GRANT RECEIV.	6400																
FIXED ASSETS																	
PLANT AND EQUIP.	28160	40000	40000	40000	42000	40000	40000	40000	40000	40000	40000	40000	40000	40000	40000	40000	40000
DEPRECIATION	0	1267	5067	8866	12666	16466	20225	23981	27577	31253	34929	37555	38079	38603	39127	39651	40000
TOTAL FIXED ASSETS	28160	38733	34933	31134	27334	23534	19775	16099	12423	8747	5871	2445	1921	1397	873	349	0
TOTAL ASSETS	32076	44957	39321	35729	31929	28127	24365	20689	17013	13337	9633	6951	6427	5903	5379	4855	398
CURRENT LIABILITIES																	
ACCTS. PAYABLE	2326	69	198	226	251	251	251	251	251	251	251	251	251	251	251	251	251
TERM & INF LOAN PAYMENT			2670	2670	2670	2670	2670	2670	2670	2670	2670	2670	0	0	0	0	0
DEMAND LOAN PAYABLE	0	2251	3165	7987	12041	16352	20831	25500	30374	35472	40785	46334	52238	55776	59672	63952	64320
TOTAL CURRENT LIAB	2326	2320	6033	10883	14962	19273	23752	28422	33295	38393	43707	49256	52481	56027	59923	64203	64571
FIXED LIABILITIES																	
TERM BANK LOAN	11360	26700	24030	21360	18690	16020	13350	10680	8010	5340	2670	0	0	0	0	0	0
INT. FREE LOAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEFERRED GOVT. ASST.	11190	11190	11190	11190	11190	11190	11190	11190	11190	11190	11190	11190	11190	11190	11190	11190	11190
AMORT.GOVT.GRANT		373	1492	2611	3730	4849	5968	7087	8206	9325	10444	11190	11190	11190	11190	11190	11190
NET GOVT. ASST.	11190	10817	9698	8579	7460	6341	5222	4103	2984	1865	746	0	0	0	0	0	0
DEFERRED TAXES	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAPITAL STOCK	7200	7200	7200	7200	7200	7200	7200	7200	7200	7200	7200	7200	7200	7200	7200	7200	7200
RETAINED EARNINGS	0	-2079	-7648	-12213	-16383	-20787	-25159	-29715	-34476	-39461	-44698	-49585	-53254	-57324	-61744	-66549	-71381
TOTAL LIABILITIES	32076	44957	39321	35729	31929	28127	24365	20689	17013	13337	9633	6951	6427	5903	5379	4855	398
WORKING CAPITAL	738	1998	-3559	-8121	-12280	-16593	-21076	-25745	-30619	-35717	-41059	-46664	-49889	-53435	-57332	-61612	-64181
EQUITY CASH FLOW	-7200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-64571
DCFROI	ERR																
	0																

COMPOSITE PANEL FACILITY

PRELIMINARY FEASIBILITY STUDY - PHASE I

NORTH WESTERN NEW BRUNSWICK AREA

FOR

DEPARTMENT OF COMMERCE AND TECHNOLOGY

PROVINCE OF NEW BRUNSWICK

APPENDIX 3

NGR INTERNATIONAL

53MMSF/YR.3/4 . MDF PLANT

DEPT.OF COMMERCE & TECHNOLOGY,NEW BRUNSWICK

TABLE 1

JOB NO.: 3961
DATE: MAY 22/87
BY: JRB

CONSTRUCTION COST SUMMARY

860	SITE AND SITE DEVELOPMENT	$ 900000
870	BUILDINGS AND STRUCTURES	$ 6400000
880	MOBILE EQUIPMENT	$ 575000
890	WOOD HANDLING	$ 1245000
100	FLAKING AND WET STORAGE	$ 1842000
200	SHAVINGS & SANDUST	$ 176000
300	FIBER PREPARATION	$ 1967000
400	FORMING EQUIPMENT	$ 3000000
500	PRESSING EQUIPMENT	$ 4648000
600	TRIM,GRADE AND STRAPPING	$ 2185000
700	HEAT ENERGY SYSTEM	$ 2000000
800	PNEUMATIC SYSTEMS	$ 886000
900	ELECTRICAL EQUIPMENT	$ 1162000
1000	INSTALLATION	$ 4566000
1100	MANUFACTURER'S REPRESENTITIVES	$ 200000
1200	SPARE PARTS	$ 530000
1300	ENGINEERING AND PROJECT MANAGEMENT	$ 2120000
1400	CONTINGENCY @ 0.15	$ 5167800
	SUB TOTAL	$39619800
1500	ESCALATION @ 0.05	$ 1722600
1600	INTEREST DURING CONSTRUCTION	$ 1791713
	TOTAL	$43134113
	USE	$43000000

10.00 % INTEREST DURING CONSTRUCTION CALCULATION

MONTH	% EXPEND.	EXPEND	EQ.&IFL	GRANT	LOAN	INTEREST
1	1	413424	413424		0	
2	1	413424	413424		0	0
3	5	2067120	2067120		0	0
4	4	1653696	1653696		0	0
5	4	1653696	1452336		201360	0
6	4	1653696	0		1653696	1678
7	5	2067120	0		2067120	15459
8	5	2067120	0		2067120	32685
9	5	2067120	0		2067120	49911
10	6	2480544	0	1720000	760544	67137
11	6	2480544	0		2480544	73475
12	6	2480544	0		2480544	94146
SUBTOTAL	52	21498848				334490
13	6	2480544	0		2480544	114817
14	6	2480544	0		2480544	135488
15	6	2480544	0		2480544	156159
16	6	2480544	0		2480544	176831
17	7	2893968	0		2893968	197502
18	7	2893968	0	3440000	-546032	221618
19	6	2480544	0		2480544	217068
20	3	1240272	0	1720000	-479728	237739
SUBTOTAL	99				28048976	1791713
21						
22						
23	1					
24						
25				1720000		

INTEREST DURING CONSTRUCTION $ 1791713

MAXIMUM CAPITAL COST ALLOWANCE

YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
BUILDINGS		160000	312000	296400	281580	267501	254126	241420	229349	217881	206987	196638	186806	177466	168592	160163	152155	
PROD.EQUIP.		8145350	16290700	8145350														
SITE IMPROVEMENTS		36000	69120	63590	58503	53823	49517	45556	41911	38558	35474	32636	30025	27623	25413	23380	21510	
OFFICE EQUIPMENT		88000	159400	127584	102067	81654	65323	52258	41807	33445	26756	21405	17124	13699	10959	8768	7014	
MOBILE EQUIPMENT		86250	146625	102638	71846	50292	35205	24643	17250	12075	8453	5917	4142	2899	2029	1421	994	
MAX. TOTAL DEPREC.		8131664	16224186	8289685	378079	316334	291203	261991	237318	217411	199922	184749	171430	159615	149036	139486	130804	
BOOK DEPRECIATION ALLOWANCE																		27485382
BUILDINGS AND SITE		176262	528187	528187	528187	528187	528187	528187	528187	528187	528187	528187	528187	528187	528187	528187	352125	
PLANT AND EQUIP.		1148438	3445314	3445314	3445314	3445314	3445314	3445314	3445314	3445314	3445314	2296876						
MOBILE EQUIP.		41684	124811	124811	124811	124811	83206											
TOTAL		1366384	4098312	4098312	4098312	4098312	4056708	3973501	3973501	3973501	3973501	2825063	528187	528187	528187	528187	352125	
AMORT.GOVT. GRANT		401000	1203000	1203000	1203000	1203000	1197000	1193250	1193250	1193250	1193250	882000						43000000

VGM INTERNATIONAL

53MMSF/4R(3/4") MDF PLANT

DEPT.OF COMMERCE & TECHNOLOGY,NEW BRUNSWICK

JOB NO.: 3961
DATE: MAY 22/87
BY: JRB

TABLE 1.3A

FINANCIAL PLAN

EQUITY FUNDS	$ 6000000
INTEREST FREE LOAN	$ 0
SUB TOTAL	$ 6000000
PROVINCIAL GRANT	$ 8600000
TERM BANK LOANS	$ 28700000
DEMAND LOAN	$ 2462351
TOTAL	$ 45762351

TABLE II

OPERATING AND MAINTENANCE LABOR COSTS

POSITION	SHIFT 1	SHIFT 2	SHIFT 3	SHIFT 4	RATE	COST/YEAR
PRODUCTION						
FOREMAN	1	1	1	1	17.50	147000
SCALES & SECURITY	1	1			11.00	46200
CAT 950	1	1			11.60	48720
CARRY LIFT	1	1	1	1	11.60	97440
DEBARKER	1	1	1	1	11.60	97440
REFINER	1	1	1	1	11.60	97440
WOOD HANDLING	1	1	1	1	11.60	97440
SLASHER DECK	1	1	1	1	11.60	97440
WAFERIZER	1	1	1	1	11.60	97440
DRYER & HEAT ENERG	1	1	1	1	11.60	97440
PRESS	1	1	1	1	12.00	100800
TRIM & GRADE	1	1	1	1	11.60	97440
STRAP & FORK LIFT	1	1	1	1	11.60	97440
SHIPPING	1	1	1	1	11.60	97440
BLENDING	1	1	1	1	11.60	97440
KNIFE GRINDER	1	0			11.60	24360
CLEANUP	1	1	1	1	11.00	92400
MAINTENANCE						
DRAFTSMAN	0				11.00	0
CHIEF ELECTRICIAN	1				17.00	35700
CHIEF MECHANIC	1				17.00	35700
ELECTRONICS	1				16.00	33600
ELECTRICIAN	1	1	1	1	16.00	134400
APP.ELECTRICIAN		1	1	1	14.00	88200
WELDER	1	1			13.00	54600
MACHINIST	1	1			14.00	58800
MILLWRIGHT	1	1	1	1	13.00	109200
APP.MILLWRIGHT	1	1	1	1	11.50	96600
GRADER	0				11.00	0
CARPENTER	1				11.50	24150
MESSENGER	0				9.60	0
CHIEF FILER	0				12.10	0
KNIFE FILER		0			11.00	0
SAW FILER			0		11.00	0
AUTO MECHANIC	1				11.20	23520
SUBTOTAL	27	22	18	18		2225790
TOTAL OPERATING & MAINTENANCE STAFF	85	OVERTIME PREMIUM @ FRINGE BENEFITS @			0.072 0.230	155825 511932
TOTAL LABOUR COSTS PER YEAR						$ 2893547

NGM INTERNATIONAL

53MMSF/YR.3/4" MDF PLANT

DEPT. OF COMMERCE & TECHNOLOGY, NEW BRUNSWICK

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TABLE III

PROFORMA SCHEDULE OF MANUFACTURING COSTS

YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
PRODUCTION-MMSF-3/8"	0	27	80	95	106	106	106	106	106	106	106	106	106	106	106	106	106	
-e3x1000	0	24	71	84	94	94	94	94	94	94	94	94	94	94	94	94	94	
CONS. PRICE INDEX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
COST MULTIPLIER	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
COST OF SALES																		
DIRECT LABOR -$x1000		794	2382	2382	2382	2382	2382	2382	2382	2382	2382	2382	2382	2382	2382	2382	2382	
LABOR BENEFITS -$x1000		171	512	512	512	512	512	512	512	512	512	512	512	512	512	512	512	
TOTAL DIRECT LABOR -$x1000		965	2894	2894	2894	2894	2894	2894	2894	2894	2894	2894	2894	2894	2894	2894	2894	
DIRECT MATERIALS -$x1000		1944	5499	6219	6939	6939	6939	6939	6939	6939	6939	6939	6939	6939	6939	6939	6939	
FACTORY OVERHEAD																		
POWER, LIGHT & HEAT -$x1000		328	927	1048	1172	1170	1170	1170	1172	1170	1170	1170	1170	1170	1170	1170	1170	
REPAIRS & MAINT. -$x1000		239	706	883	985	985	985	985	985	985	985	985	985	985	985	985	985	
PACKING MATERIALS -$x1000		72	212	265	295	295	295	295	295	295	295	295	295	295	295	295	295	
PREPRODUCTION EXP. -$x1000		340																
DEPR.PLANT & EQUIP -$x1000		1190	3570	3570	3570	3570	3529	3445	3445	3445	3445	2297	0	0	0	0	0	
AMORT.GOV'T GRANT -$x1000		-401	-1203	-1203	-1203	-1203	-1203	-1203	-1203	-1203	-1203	-802	0	0	0	0	0	
TOTAL MANUF. COST -$x1000		4676	12687	13676	14638	14638	14609	14525	14525	14525	14525	13778	12283	12283	12283	12283	12283	

VGM INTERNATIONAL

53MMSF/YR(3/4") MDF PLANT

DEPT. OF COMMERCE & TECHNOLOGY, NEW BRUNSWICK

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DATE: MAY 22/87
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TABLE IV

PROFORMA SELLING AND ADMINISTRATIVE EXPENSES

YEAR		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
PRODUCTION-MMSF-3/8"		0	27	80	95	186	186	186	186	186	186	186	186	186	186	186	186	186
-%3x1000		0	24	71	84	94	94	94	94	94	94	94	94	94	94	94	94	94
CONS. PRICE INDEX		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COST MULTIPLIER		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SALES PRICE INCREASE				0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.052
SALES PRICE	-$/MSF		262	262	262	262	262	262	262	262	262	262	262	262	262	262	262	262
DISCOUNTS & DUTY	-$/MSF	18	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
TRANSPORTATION	-$/MSF	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
MILL NET PRICE	-$/MSF		222	222	222	222	222	222	222	222	222	222	222	222	222	222	222	222
SALES	-$x1000	0	6939	18861	24417	27244	27244	27244	27244	27244	27244	27244	27244	27244	27244	27244	27244	27244
SELLING EXPENSE																		
DISCOUNTS & DUTY	-$x1000		444	1316	1563	1744	1744	1744	1744	1744	1744	1744	1744	1744	1744	1744	1744	1744
SALARIES	-$x1000		25	62	62	62	62	62	62	62	62	62	62	62	62	62	62	62
EMPLOYEE BENEFITS	-$x1000		5	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
ADVERTISING	-$x1000		28	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
TWA DUES	-$x1000		5	26	31	35	35	35	35	35	35	35	35	35	35	35	35	35
TRAVELLING	-$x1000		32	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
TRANSPORTATION	-$x1000		643	1985	2262	2524	2524	2524	2524	2524	2524	2524	2524	2524	2524	2524	2524	2524
TOTAL	-$x1000		1172	3447	4056	4502	4502	4502	4502	4502	4502	4502	4502	4502	4502	4502	4502	4502
ADMINISTRATIVE EXPENSE																		
SALARIES	-$x1000		154	348	348	348	348	348	348	348	348	348	348	348	348	348	348	348
EMPLOYEE BENEFITS	-$x1000		31	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78
TRAVELLING	-$x1000		12	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
INSURANCE & TAXES	-$x1000		130	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250
FIXED MAINTENANCE	-$x1000		24	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
TELEPHONE & TELEX	-$x1000		5	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
HEAT,LIGHT & A/C	-$x1000		2	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
SUPPLIES AND MISC.	-$x1000		7	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
LEGAL AND AUDIT	-$x1000		20	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
BAD DEBTS	-$x1000		35	183	222	136	136	136	136	136	136	136	136	136	136	136	136	136
BANK CHG.& SUNDRY	-$x1000		30	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
DEPR. OF BUILDINGS	-$x1000		176	528	528	528	528	528	528	528	528	528	528	528	528	528	528	352
TOTAL	-$x1000		596	1550	1569	1584	1584	1584	1584	1584	1584	1584	1584	1584	1584	1584	1584	1407
FINANCIAL EXPENSE CALCULATION																		
DEMAND LOAN-START	-$x1000	0	0	2462	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEMAND LOAN-END	-$x1000	0	2462	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TERM LOAN-START	-$x1000	0	13778	28700	28700	25830	22960	20090	17220	14350	11480	8610	5740	2870	0	0	0	0
TERM LOAN-END	-$x1000	13778	28700	28700	25830	22960	20090	17220	14350	11480	8610	5740	2870	0	0	0	0	0
TOTAL LOAN-START	-$x1000	0	13778	31162	28700	25830	22960	20090	17220	14352	11480	8610	5740	2870	0	0	0	0
TOTAL LOAN-END	-$x1000	13778	31162	28700	25832	22960	20090	17220	14352	11480	8610	5740	2870	0	0	0	0	2
INTEREST	-$x1000	689	749	1993	1917	1648	1353	1066	1079	1291	1205	718	431	144	0	0	0	2

NGM INTERNATIONAL

53MMSF/YR.3/4" MDF PLANT

DEPT.OF COMMERCE & TECHNOLOGY,New BRUNSWICK

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BY: JRB

TABLE 7

PROFORMA STATEMENT OF REVENUE AND EXPENSES

YEAR		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
PRODUCTION-MMSF-3/8"		0	27	80	95	126	126	126	126	126	126	126	126	126	126	126	126	126
-m3x1000		0	24	71	84	94	94	94	94	94	94	94	94	94	94	94	94	94
SALES	-$x1000	0	6939	20561	24417	27244	27244	27244	27244	27244	27244	27244	27244	27244	27244	27244	27244	27244
COST OF SALES	-$x1000	0	4670	13687	13676	14658	14658	14629	14525	14525	14525	14525	13778	12283	12283	12283	12283	12283
GROSS MARGIN	-$x1000	0	2269	7954	10741	12586	12586	12615	12719	12719	12719	12719	13466	14961	14961	14961	14961	14961
SELLING EXPENSE	-$x1000	0	1172	3447	4056	4502	4502	4502	4502	4502	4502	4502	4502	4502	4502	4502	4502	4502
ADMIN. EXPENSE	-$x1000	0	596	1758	1569	1584	1584	1584	1584	1584	1584	1584	1584	1584	1584	1584	1584	1487
FINANCIAL EXP.	-$x1000		749	1993	2727	2443	2153	1866	1579	1292	1005	718	431	144	0	0	0	0
EARNINGS PRETAX	-$x1000	0	-254	-36	2389	4868	4355	4684	5054	5341	5628	5915	6750	8732	8875	8875	8875	9851
INCOME TAXES																		
CURRENT	-$x1000	0	0	0	0	0	0	187	3316	3455	3592	3727	3862	3995	4864	4869	4873	4877
DEFERRED	-$x1000	0	0	0	1014	1761	1889	1929	1116	-1127	-1136	-1144	-818	-159	-164	-169	-173	-98
EARNINGS	-$x1000	0	-254	-36	1375	3107	2466	2569	2854	3013	3172	3332	3906	4895	4975	4975	4975	5072
NET EARNINGS	-$x1000	0	-254	-36	1375	3107	2466	2569	2854	3013	3173	3332	3906	4895	4975	4975	4975	5072

NOM INTERNATIONAL

53MMSF/YR(3/4") MDF PLANT

DEPT.OF COMMERCE & TECHNOLOGY,NEW BRUNSWICK

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DATE: MAY 22/87
BY: JRB

TABLE VI

CHANGES IN FINANCIAL POSITION

YEAR		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
SOURCE OF FUNDS																		
EARNINGS	-$x1000	0	-254	-36	1375	2387	3466	2649	2954	3813	3173	3332	3986	4895	4975	4975	4975	5872
DEPRECIATION	-$x1000	0	1366	4098	4098	4098	4098	4057	3974	3974	3974	3974	2835	528	528	528	528	352
AMORT.GOVT.AID	-$x1000	0	-421	-1203	-1203	-1203	-1203	-1203	-1203	-1203	-1203	-1203	-802	0	0	0	0	0
DEFERRED TAXES	-$x1000	0	0	0	1014	1761	1899	1929	-1117	-1117	-1136	-1144	-818	-159	-164	-169	-173	-98
FUNDS FROM OPER.	-$x1000	0	711	2962	5285	6964	7261	7431	4529	4857	4807	4959	5111	5264	5339	5334	5330	5326
INT. FREE LOAN	-$x1000	0																
INV. TAX CREDIT	-$x1000	787	585	0	0	0	0	2058	0	0	0	0	0	0	0	0	0	0
PROV. GRANT	-$x1000	1710	6838															
LONG TERM LOAN	-$x1000	13778	14922	0														
ISSUE OF SHARES	-$x1000	6000																
TOTAL	-$x1000	22285	23098	2860	5285	6964	7261	9439	4529	4857	4807	4959	5111	5264	5339	5334	5330	5326
APPLICATION OF FUNDS																		
FIXED ASSETS	-$x1000	21498	21502															
TERM LOAN INSTAL.	-$x1000			2870	2870	2870	2870	2870	2870	2870	2870	2870	2870	0	0	0	0	0
I.F.LOAN PAYMENT	-$x1000					0	0	0	0	0								
TOTAL	-$x1000	21498	21502	2870	2870	2870	2870	2870	2870	2870	2870	2870	2870	0	0	0	0	0
INCREASE IN FUNDS		787	1596	-10	2415	4094	4391	6619	1659	1987	1937	2089	2241	5264	5339	5334	5330	5326
WORKING CAPITAL-START			787	2383	2373	4787	8881	13272	19891	21549	23536	25243	27332	29573	34837	40176	45510	50840
WORKING CAPITAL-END		787	2383	2373	4787	8881	13272	19891	21549	23536	25243	27332	29573	34837	40176	45510	50840	56166

NGM INTERNATIONAL

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DEPT.OF COMMERCE & TECHNOLOGY,NEW BRUNSWICK

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TABLE 3.1

DIRECT MATERIALS AND SERVICES COSTS

ITEM	COST/UNIT	UNIT USEAGE/m3		COST/m3
WOOD	19.90	m3	1.50	29.85
RESIN	0.55	kg	77.00	42.35
WAX	0.44	kg	4.05	1.78
ELECTRICITY	0.04	kwh	290.00	11.47
HEAT ENERGY	0.00			0.00
PACKAGING MATERIAL				3.00
SUPPLIES & MAINT.				10.00
TOTAL DIRECT MATERIALS AND SERVICE COSTS				99.45

TABLE VII

ADMINISTRATION AND OVERHEAD COSTS

PLANT MANAGER	1	50000
SALES MANAGER	1	46000
PRODUCTION MANAGER	1	41000
MAINTENANCE SUPERINTENDENT	1	39000
QUALITY CONTROL SUPERINTENDENT	1	35000
QUALITY CONTROL TECH.	4	80000
PURCHASING	1	30000
PLANT ENGINEER	0	0
SHIPPING FOREMAN	1	31000
SECRETARY-CLERKS	3	42000
SALES AND ORDER CLERK	1	16000
SUB TOTAL	15	410000
FRINGE BENEFITS @ 20 %		82000
SUB TOTAL	$	492000
OFFICE EXPENSE		
TELEPHONE AND TELEX		13000
HEAT, LIGHT AND A/C		5500
TRAVEL AND LIVING - GENERAL		30000
SALES, TRAVEL AND LIVING		75000
ADVERTISING AND PROMOTION (ALLOW)		50000
SUPPLIES AND MISCELLANEOUS		18000
LEGAL AND AUDIT	$	50000
SUB TOTAL	$	241500
TOTAL ADMIN. & OFFICE EXP.	$	733500
INSURANCE AND TAXES	$	250000
SUMMARY OF FIXED CASH ANNUAL OVERHEADS		
ADMINISTRATION AND OFFICE EXPENSE	$	733500
FIXED MAINTENANCE EXPENSE	$	60000
INSURANCE AND TAXES	$	250000
SECURITY AND CONTINGENCIES	$	71000
TOTAL ADMIN. AND OVERHEAD	$	1114500

FRINGE BENEFITS	%
VACATION	3.00
SICK LEAVE	1.50
GROUP INSURANCE	4.00
COMPANY PENSION	0.00
CPP	1.90
U.I.C.	3.40
	0.00
WORKMEN'S COMP.	8.00
TOTAL	22.60
USE	23

AGM INTERNATIONAL

53MMSF/YR 3-[illegible] MDF PLANT

DEPT. OF COMMERCE & TECHNOLOGY, NEW BRUNSWICK

JOB NO.: 3961
DATE: MAY 22/87
BY: JRB

TABLE VIII

CURRENT AND DEFERRED TAX CALCULATION

YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
EARNINGS PRETAX -6x1000	0	-254	-36	2389	4868	4355	4684	5054	5341	5628	5915	6950	8732	8875	8875	8875	9051
TAX PAYABLE		0	0	10.4	1781	1589	1235	1103	1338	1456	1583	3244	3837	3900	3900	3900	3979
DEPRECIATION ALLOWANCE	0	1366	4098	4098	4098	4098	4057	3974	3974	3974	3974	2825	528	528	528	528	352
AMORT. GOV'T GRANT	0	-401	-1203	-1203	-1203	-1203	-1203	-1203	-1203	-1203	-1203	-802	0	0	0	0	0
MAX. CAPITAL COST ALLOWANCE	0	6132	12224	6298	370	326	291	262	238	217	200	185	171	160	149	139	131
CORR. TAXABLE INCOME		-5420	-9364	-1005	6594	6924	7147	7563	7874	8181	8486	8788	9088	9244	9254	9264	9272
LOSS CARRY FWD	0	-5420	-14785	-15790	-9196	-2272	0	0	0	0	0	0	0	0	0	0	0
CURRENT TAXABLE INCOME		-5420	-14785	-15790	-9196	-2272	4975	7563	7874	8181	8486	8788	9088	9244	9254	9264	9272
CORRECTED TAX PAYABLE		0	0	0	0	0	2165	3316	3455	3592	3727	3862	3995	4064	4069	4073	4077
INVEST.TAX CREDIT AVBL.	1968	2643	3058	3058	3058	3058	3058	0	0	0	0	0	0	0	0	0	0
INVEST.TAX CREDIT USED	787	585	0	0	0	0	2058	0	0	0	0	0	0	0	0	0	0
CURRENT TAX PAYABLE	0	0	0	0	0	0	107	3316	3455	3592	3727	3862	3995	4064	4069	4073	4077
DEFERRED TAXES	0	0	0	1814	1781	1589	1128	-1113	-1117	-1136	-1144	-818	-159	-164	-169	-173	-98

NGM INTERNATIONAL

53MMSF/YR(3/4") MDF PLANT

DEPT.OF COMMERCE & TECHNOLOGY,NEW BRUNSWICK

JOB NO.: 3961
DATE: MAY 22/87
BY: JRB

TABLE IX

BALANCE SHEET

YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
CURRENT ASSETS																	
CASH	2481	10	2465	4628	8745	13128	19758	21389	23175	25112	27232	29536	31932	37269	42683	47933	56841
ACCTS. RECV.& INV.	0	2595	2961	3237	3237	3135	3132	3232	3232	3232	3381	3139	3139	3139	3139	3139	356
INV. TAX CREDIT RECVBL.	787	585	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GRANT RECEIVABLE	0	1720	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL CURNT. ASSET	3268	4910	5426	7865	11983	16363	22982	24621	26407	28344	30433	32674	35869	40407	45742	51071	56397
INV. TAX CREDIT DEFF.	1643	1258	1058	1056	1058	1056	0	0	0	0	0	0	0	0	0	0	0
DEFF. GRANT RECEIV.	6882																
FIXED ASSETS																	
PLANT AND EQUIP.	21498	43000	43000	43000	43000	43000	43000	43000	43000	43000	43000	43000	43000	43000	43000	43000	43000
DEPRECIATION	0	1366	5464	9563	13661	17759	21816	25790	29763	33737	37710	40535	41863	41592	42120	42648	43000
TOTAL FIXED ASSETS	21498	41634	37536	33437	29339	25241	21184	17210	13237	9263	5290	2465	1937	1408	880	352	0
TOTAL ASSETS	34289	48802	45020	43360	43379	42662	44166	41831	39644	37608	35723	35139	37805	41816	46622	51424	56397
CURRENT LIABILITIES																	
ACCTS. PAYABLE	2481	65	183	207	231	231	231	231	231	231	231	231	231	231	231	231	231
TERM & INT LOAN PAYMENT			2870	2870	2870	2870	2870	2870	2870	2870	2870	2870	0	0	0	0	0
DEMAND LOAN PAYABLE	0	2462	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL CURRENT LIAB	2481	2527	3053	3077	3101	3101	3101	3101	3101	3101	3101	3101	231	231	231	231	231
FIXED LIABILITIES																	
TERM BANK LOAN	13778	26700	25532	23960	20898	17718	14312	11462	8612	5740	2870	0	0	0	0	0	0
INT. FREE LOAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DEFERRED GOVT. ASST.	12030	12030	12030	12030	12030	12030	12030	12030	12030	12030	12030	12030	12030	12030	12030	12030	12030
AMURT.GOVT.GRANT		401	1604	2807	4010	5213	6416	7619	8822	10025	11228	12030	12030	12030	12030	12030	12030
NET GOVT. ASST.	12030	11629	10426	9223	8020	6817	5614	4411	3208	2005	802	0	0	0	0	0	0
DEFERRED TAXES	0	0	0	1314	1776	4665	6593	5477	4352	3214	2078	1252	1893	929	761	588	489
CAPITAL STOCK	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
RETAINED EARNINGS	0	-254	-298	1885	3392	5859	8527	11362	14375	17548	20880	24786	29681	34655	39630	44685	49677
TOTAL LIABILITIES	34289	48802	45020	43360	43379	43662	44166	41831	39644	37608	35723	35139	37805	41816	46622	51424	56397
WORKING CAPITAL	787	2383	2373	4787	8881	13262	19881	21519	23306	25243	27332	29573	34837	40176	45510	50840	56166
EQUITY CASH FLOW	-6000	2	2455	2162	4118	4383	6622	1639	1787	1937	2120	2303	2374	5339	5334	5330	7877
DCFROI	0.376																